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VOL. 9

NO. 11



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The Refrigeration Service Engineer

Vol. 9

No. 11

November, 1941

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Official Organ
REFRIGERATION SERVICE
ENGINEERS SOCIETY

Cover

Electric welding a G.E. Hermetic unit after repairs. The unit is held rigid in the lathe where it is easy to revolve as the welding progresses. Picture taken in Service Parts Co., shop, Melrose Park, Ill.

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SERVICE ENGINEER

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MANPOWER AND MATERIALS

KEYS TO NATIONAL DEFENSE

-they must be conserved

Defense requirements must come first. Demands are heavy—will be heavier—and they must be met. Hence, it is a patriotic duty to conserve manpower and materials—the twin keys to National Defense.

In laying out refrigeration and air conditioning installations, it is necessary to consider these factors. As the army grows—capable service men will be fewer—the answer is equipment that requires minimum service. If equipment is ineffective and has to be replaced, added and unnecessary loads are thrown on production machines needed for turning out military supplies. Additional materials must be used which may be needed elsewhere. Select equipment that won't have to be replaced.

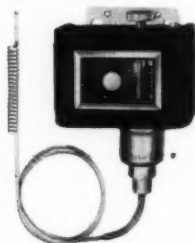
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Brazing as an Aid to Servicing Refrigerators

By R. N. CHAPIN*

WHAT is the difference between soft soldering, brazing and welding? This is fundamental but it is necessary to have a common understanding of the term used. Soft soldering and brazing are essentially the same in that the parts being joined are not melted when heated to the flowing temperature of the alloy being used. In other words, the soft solder or brazing alloy has a considerably lower melting point than the copper, iron, steel, etc., to which it is being applied.

On the other hand, when welding, the adjacent edges of the parts being joined are melted and fused or mixed with the filler rod being added. This rod is usually of approximately the same composition as the parts being joined. While there are some welded parts on refrigerators, it is probable that 95% of the oxyacetylene torch work will be brazing.

Fig. 1 is a simple chart that shows the approximate temperature range of various metal joining processes. A point of particular interest is the wide gap between the upper limit of soft soldering at 550° F. and the lowest brazing temperature of 1175° F. Incidentally, it is this alloy flowing freely

at 1175° F. that is most widely used by the refrigerator manufacturer today.

When data was being collected for the preparation of this article, calls were made at quite a few of both the small individually owned refrigerator repair shops and the large ones operated by the Manufacturers. While the methods of procedure were somewhat different, the problems were the same in both cases. Apparently it is practically impossible to secure replacement parts and both the large and small shops are now making repairs that were not even considered a few months ago.

It is evident that the service field is going through a very definite transition period, at least as far as the type of repair work that has to be done. Local newspapers have printed columns about the many industries that have had to curtail production because of lack of certain basic materials. The refrigerator manufacturer is one of these and the result is that you will not be able to secure repair parts. There is another reaction to this news. The average home owner will not be able to purchase a new refrigerator when he thinks his present one is getting old. You are going to have to keep that unit working and without being able to secure any replacement parts for those that may be worn or broken.

* Air Reduction Sales Company. Presented before the R.S.E.S. Second Annual New York State Association Convention.

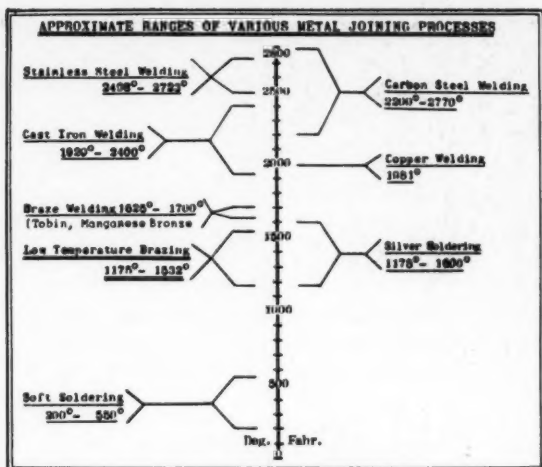


Fig. 1. Approximate Ranges of Various Metal Joining Processes

Perhaps you have been through one or more of the larger refrigerator manufacturing plants and have seen the high degree of mass production used in the assembly lines. For anyone who is at all mechanically minded, it is a pleasure to see the speed and precision with which the units are fabricated. There is no "haste makes waste." Indeed, it is rare to see an evaporator, or coil, or condenser, or a subassembly rejected when the hydrogen test for leaks is made in a water tank.

While we are not concerned with manufacturing procedure, I believe that there is an important relation here with service work. In general, it may be said that parts should be disassembled by the same means with which they were assembled. On a soft solder joint, a soldering copper would be used. On a brazed joint, you must use an oxyacetylene torch, for this method of heating was used by the manufacturer in almost every case.

It is necessary to know what joining method the manufacturer used and to have some knowledge of why this was selected. No doubt you have found that the majority of joints are made with a brazing alloy, rather than soft solder, and this is true for units made for quite a few years past. There are some made with soft solder but these can usually be quickly determined with a knife or sharp tool. Even at the lowest melting point brazing alloy is hard enough to offer some resistance to scratching.

In connecting the various parts of the mechanical unit, the manufacturer has considered the following factors: gas tightness, resistance to vibration, strength, corrosion resistance, appearance and cost. The strength factor may seem ambiguous as used above, but as joint design plays an important part, the alloy must not require too much lap area or costs will be excessive.

It was found during the early days that soft solder joints would fail as they were not sufficiently resistant to corrosion, vibration and other stresses. On the other hand, it was extremely difficult to use the high zinc bronze brazing alloys because of the high temperature required to make them

flow. Further, there was the oxidation problem with these alloys and damage to parts being joined.

When the silver brazing alloys were introduced somewhere around 1930, they were immediately accepted. The average household refrigerator has between 20 and 40 brazed joints. As last year's production was approximately 2,000,000 units, this means that there were from 40,000,000 to 80,000,000 joints made up. When it is considered that these alloys have been used for approximately ten years, actually hundreds of millions of joints are in service today.

There are three types of brazing alloys being used by the manufacturers. They are: Easy-Flo—50% silver—balance copper, zinc and cadmium and is free flowing at 1175° F.

Sil-Fos—15% silver—balance copper and phosphorus and is free flowing at 1300° F.

Phos-Copper—Copper and phosphorus and is free flowing about 1500° F.

Easy-Flo can be used on ferrous and non-ferrous metals such as steel, stainless steel, monel, nickel, copper, brass, etc. Sil-Fos and Phos-Copper, because of their phosphorous content, can be used only on non-ferrous metals such as copper, brass, bronze, etc. They must not be used on iron or steel, strong joints cannot be obtained.

The first two mentioned above are silver brazing alloys. These also may be called silver solders but there is a definite trend away

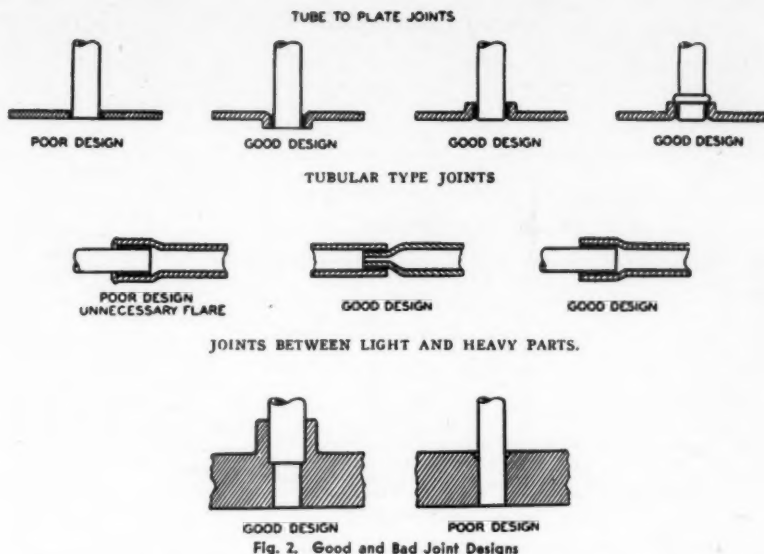


Fig. 2. Good and Bad Joint Designs

from the use of this term. When the word "solder" is used one does not have the same feeling of strength as implied when "brazing" is used. For this reason, the term "silver brazing alloys" is rapidly supplanting "silver solders." However do not forget that they are synonymous as a great many people still use the older term.

Phos-Copper, although containing no silver, is considered by some to be in the same general group with Sil-Fos and Easy-Flo. This is probably due to its relatively low melting point and also to the fact that it is often used on similar types of joints. However, its use is not as extensive as the lower melting silver content alloys.

We have mentioned the advisability of using the same heating method as employed by the manufacturer. The same brazing alloy should be used as well. Obviously, a careful study has been made to insure the correct joining medium under the operating conditions that exist. You can rest assured that the most economical material is used for when thousands of units per day are manufactured, a saving of only a few cents per joint assumes large totals. I merely mention this to point out that while it may seem expensive to use a 50% silver alloy on a particular joint, there must be a very good reason for this. Incidentally, this alloy is used on probably 60% of the joints of most units you are repairing today.

The proper design of joints does not affect the repairman to any great extent. You will disassemble certain parts and then put them back in the same way. Tubing connection or joints are heated and pulled apart when the brazing alloy becomes molten. However, it may be necessary to do more than this in some cases and it is advisable to point out a few requirements for proper design. Fig. 2 shows typical poor and good joints. All these low temperature brazing alloys are extremely fluid and free flowing at their brazing temperature and it is necessary to have essentially close fits for strong and tight connections.

Note that there must be a lap. This does not have to be extensive for when snug fits are made, it need be only two or three times the thickness of the thinner part. This may be the tubing or perhaps the evaporator or condenser shell. There is no definite rule that can be given regarding this—an appreciable lap area will provide sufficient strength.

Another important factor is the fit mentioned above. Experience has shown that clearances of .002 inch to .006 inch are most satisfactory. In the case of sleeve joints or tubing, a fit that is just hand tight is recommended. Do not worry about the brazing alloy flowing into the joint. When heated to the proper temperature it will be observed that the alloy will flow to the far

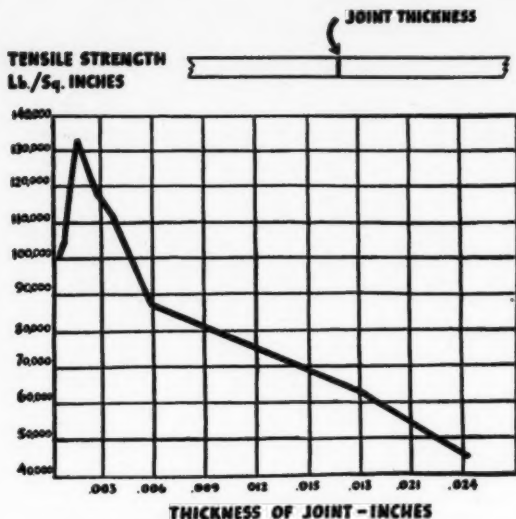


CHART BASED ON BUTT JOINTS-STAINLESS STEEL TO STAINLESS STEEL
Fig. 3. The Relation of Joint Thickness to Tensile Strength

end by capillary action. The position of the joint has nothing to do with it as the alloy will flow up or horizontally equally well if the fit is close enough to utilize the capillary action.

Fig. 3 shows the relation of joint thickness to tensile strength. This chart was made from laboratory data on a great many joints. Easy-Flo was used on stainless steel and you can see that rather high strengths were obtained with joint separations even up to .020 inch. While butt joints were used in securing these data, laboratory conditions are far different than those you experience and it is practically impossible to properly line up butt joints to provide proper clearances in the shop. A few experimental joints on scrap parts will illustrate this clearly.

There is one type of joint that the repairman will use more than any other. This is the simple flared tubing connection. You are going to have to make changes in tubing runs which will necessitate adding to or shortening them. When expanding tubing for a flared or sleeve joint, be sure to have the flare no larger than necessary and tubing walls on both parts are parallel and fit snugly. Figs. 4 and 5 show the incorrect and correct joint of this type.

It is very important to have clean surfaces for brazing. Of course this is true

where soft solders are used but because of the higher temperature it is far more necessary. Any oil, grease or other dirt will oxidize when heated with the torch and this will prevent proper flowing of the brazing alloy. The manufacturer degrades the parts before brazing but most repair shops will not have this equipment available. Carbon tetrachloride is very effective for removing oil and grease. The surfaces should then be wiped clean and rubbed with sand paper or emery cloth.

When taking joints apart while making repairs, it is advisable that the same cleaning procedure be used. There is certain to be grease, oil and oxides around the joint and these should be carefully cleaned as it will greatly simplify reassembly. The presence of alloy on a

tubing end does no harm provided it is clean when made up into a joint again.

There is another important reason for cleaning oil and grease from areas being heated and that is the possibility of starting a fire. Most of the work will be done on the bench where the unit has been removed from the cabinet but attention is drawn to this as safe practice. The use of asbestos board will prevent adjacent parts from becoming overheated.

Proper fluxing is as important as clean joints and correct design. The fluxes used for soft soldering are of no value when brazing as the higher temperatures used causes them to boil away and form oxides on the surfaces they are supposed to clean.

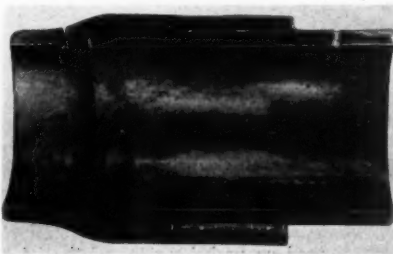


Fig. 4. Typical Result When Clearance is too Great

Flux is used for three reasons:

1. To protect the work from oxidation during the heating period.
2. To dissolve the oxides on the joint surfaces when the brazing temperature is reached.
3. To provide a clean surface on which the brazing alloy can readily wet or tin so they will flow freely.

It is essential to remember that a flux is not entirely active until it is liquid. There is a protective action until this point is reached but oxides are not dissolved until it is molten. This means that the melting point of the flux must be lower than that of the brazing alloy used. While there are numerous fluxes of this type on the market, Handy Flux is recommended as it is made by the manufacturer of Easy-Flo and Sil-Fos. It is completely liquid at 1100° F.

Just a word of caution about fluxes. In running down reported troubles with the application and use of low temperature brazing alloys, improper cleaning or fluxing is very often the cause. In some instances the borax and boric acid fluxes used with bronze brazing rods have been used. These are not liquid until a temperature of about 1600° F. is reached with the result that they are not effective in reducing oxides at the joint.

Flux can be applied to both parts with a small brush before assembly is made. Handy Flux can be thinned with clean water when it becomes too thick. It should be of a consistency that applies readily without leaving an excessive amount on the parts. Flux removal is important but no trouble will be experienced here as you will find that a stiff brush or swab with warm water will soon remove the excess. In some shops this is done while the joint is still warm from the heat of brazing.

It is advisable to perform the brazing operation in an open, well ventilated room.



Fig. 4. Simple Flux Fluidity Test

With the high temperature of the oxy-acetylene torch it is possible to cause some fuming. In some shops where they are brazing all day, exhausters, fume collector or other ventilating devices are used.

I have outlined in a brief and fundamental way the more important aspects of brazing. Space does not permit that we consider each part of a unit and outline the proper procedure to be used. There is one important point to be stressed—brazing with an oxyacetylene torch is not difficult. Any repairman who knows how to soft solder and likes to work with tools can do a very creditable job in a surprisingly short time. The comparison to soft soldering has been made several times, for there is a definite similarity to brazing, only a higher temperature is used.

For those who have never used an oxy-acetylene torch, it is suggested that scrap parts be used for practice work. This will teach control of the very hot flame and experience in judging proper tip size for use on the various gauges of metals. The operator will soon learn that copper requires a larger tip than steel of the same thickness as the heat travels away from the point faster in copper. Further, there is the salesman or serviceman from the welding equipment supply house who can spend some time with new operators showing them how to set up the apparatus and pointing out safety precaution to be observed in its use.

Some of the typical repair jobs that have been observed are:



Fig. 5. Section of a Properly Designed and Made Joint

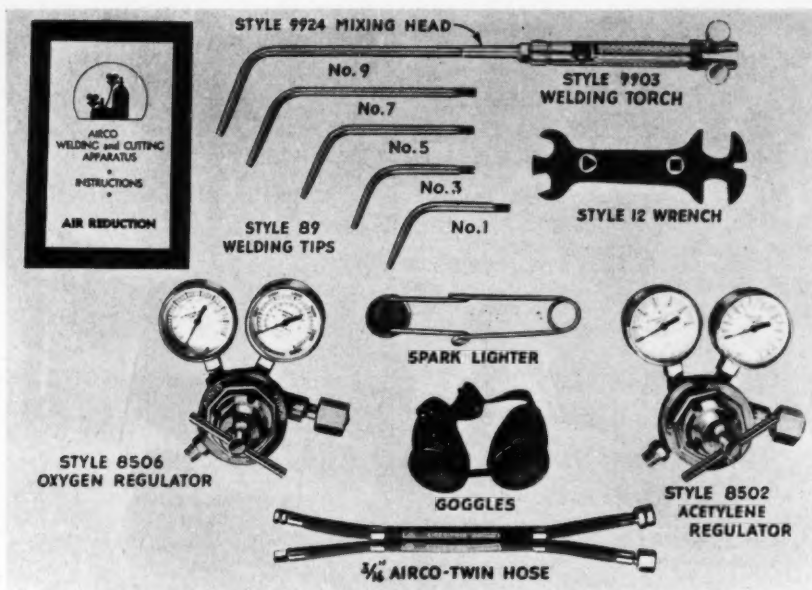


Fig. 7. Oxyacetylene Equipment for Brazing

Tubing connections to receiver tanks, evaporators, condensers and other similar parts.

Repair of broken joints holding shelves in evaporators.

Repairs to tubing that may be broken or worn. In the case of a pinhole leak, brazing alloy can be applied as a coating.

Unit coolers, oil separators, coils of all types, water coolers and all the other parts you may have to repair can usually be restored to good condition.

Space does not permit a discussion of cast iron or steel welding or brazing with bronze. The apparatus serviceman or salesman mentioned above will be glad to give you any information needed on this as well as show your operator how it should be done. This is their job and they will always respond if you get into trouble or have questions as to what rod should be used.

Equipment Needed for Brazing

The torch should be as small and light as possible and yet be capable of doing the largest job. Then there is the mixer and tips of which you should have a range of

sizes. It is poor policy to try to economize and do all jobs with one size of flame. Three or four different sizes should be available. The hose should be long enough to reach from the location of the gas cylinders to the bench. 25 feet is usually sufficient. In order to reduce the pressure of 2,000 pounds per square inch in the oxygen cylinders and 250 pounds per square inch in the acetylene cylinder to the 2, 3, or 4 pounds used at the torch, depending on the tip size, pressure reducing regulators are needed. There is one for each cylinder and the wrong hose connection cannot be made either at the regulator or torch as the oxygen hose connection has a right hand thread while the acetylene is left hand. The operator should be provided with goggles to protect his eyes from the glare of the flame. A sparklighter and 5-way wrench to make all connections completes the list of equipment needed to start brazing.

The cylinders of oxygen and acetylene are leased for a definite period of time by the gas manufacturer. The brazing alloy can be purchased from several sources but usually it is most convenient to secure it from the gas and equipment supply house with whom you are dealing.

The Open and Sealed Type Norge Refrigerators

(CONTINUED FROM THE OCTOBER ISSUE)

The operation, construction and general service data appeared in the October issue. This article contains a description of the electrical system and its adjustment.

Operation of G.E. Magnetic Relay

THE 1/12 horsepower motor used with the sealed-in Rollator is of the condenser start type. By means of a relay, the starting winding is cut into the circuit when the motor is started and is cut out of the circuit when the motor is up to speed.

The main winding current always flows through the relay coil (A) (Fig. 5). When the motor is first started, the initial flow of current is strong enough to magnetize the coil (A) and pull in the starting relay armature (B), closing the starting winding contacts (C). This shunts the current through the starting windings of the motor.

As the motor speed increases, the current passing through the relay magnet coil (A) decreases, allowing the armature (B) to pull out, opening the starting winding contacts (C). The motor then continues to run as a single phase induction motor.

If the load on the motor becomes excessive, the heater coil (D) (Fig. 6) causes the bi-metal strip (E) to move towards the small magnet (F). As the bi-metal strip is pulled against the magnet the main circuit is broken at contacts (G).

As the motor cools, the procedure is reversed and the contacts meet, starting the motor.

To function correctly, the motor relay must be mounted in the correct upright position. One end of the relay is stenciled "Top for 60 Cycle." Be sure this end is up when mounting the relay for a 110 Volt, 60 Cycle installation.

The opposite end of the relay is stenciled "Top for 50 Cycle" and when the unit is to be operated from 50 Cycle current, invert the relay and mount on the unit with the "Top for 50 Cycle" stenciling up.

G.E. Relay and Condenser

The relay and condenser should be serviced as an assembly. These parts of the motor starting mechanism are so closely allied that, in the event either part fails, a complete new relay and condenser assembly should be installed on the unit.

A quantity of the sealed-in systems are equipped with Delco motors, condensers and relays. Delco equipment is interchangeable with G.E. equipment for use on either 50 or 60 cycle.

Due to the design of the Delco hot wire relay, it is not necessary to invert the relay for 50 cycle operation. One end of the case is stenciled TOP and this end should be UP when installed.

Operating principle of the hot wire relay is briefly as follows: Two contacts in the relay, one the starting contact and the second the running contact, are either open or closed, depending upon the movement or flexing of a bi-metal strip A-B called the "hot wire." Heat, resulting from current flow causes the hot wire to flex.

With no current to the relay, both starting and running contacts are in the closed position. When current is first applied, it flows through the starting contact and starting windings of the motor. The initial flow of current heats the wire causing it to flex. This movement actuates the starting contact until it opens, breaking the starting current. The current then continues to flow through the running contact and running windings of the motor.

If the motor should become overloaded, the additional heat present causes a further flexing of the hot wire, resulting in the running contact opening and stopping the motor.

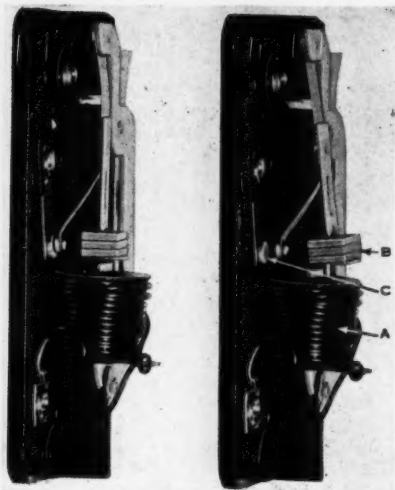


Fig. 5—Showing operation of relay

Electrical Service

When making connections to motor terminals, it is imperative that the proper wires are attached to the proper terminals. To simplify making connections, the motor housing is stamped in white, at each terminal, with letter "R," "B" or "W" indicating that the red, black or white motor wire is to be attached to that terminal. A small wiring diagram is also glued to the inside of the machine compartment panel.

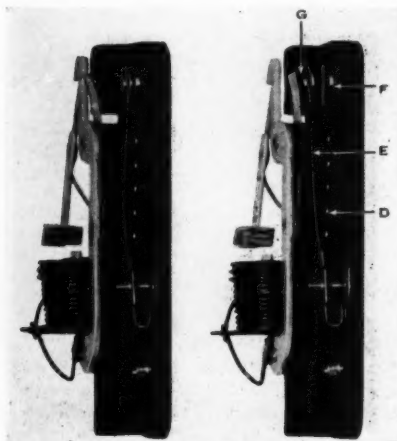


Fig. 6—Showing operation of overload

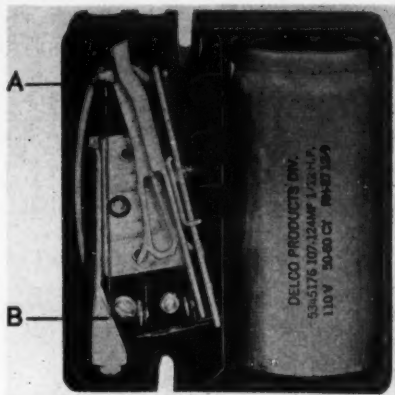


Fig. 7—Delco relay and condenser assembly

The electrical circuit comprises the relay and condenser assembly, cold control, wiring and sealed motor.

To check the above parts in the electrical circuit, it is necessary to have two pieces of test equipment—a test lamp as shown in Fig. 11 and a test relay and condenser assembly as shown in Fig. 12. Both pieces of equipment may be made from standard material and parts in stock.

The test lamp can be made as shown and is used for checking the continuity of the circuit in the unit and the wall outlet.

The test relay and condenser consists of a standard relay and condenser properly wired with a three wire cord for making connections to the motor terminals; and a two wire cord with plug for inserting into the wall outlet. Terminal connections are made as shown to complete the circuit without a cold control.

The three wire cord should be long enough to reach the motor terminals with test assembly resting on floor. The two wire cord should be long enough to reach the wall outlet.

Test relay and condenser assemblies, complete with mounting bracket and wiring as illustrated, may be secured under part numbers RH-2394, 1/12 H.P. 50/60 cycle and RH-2395, $\frac{1}{8}$ H.P. 50/60 cycle.

By disconnecting the refrigerator from the wall outlet and removing the unit leads from the motor terminals, the motor can be connected directly to the wall outlet through the test relay and condenser. In this manner, the operation of the motor can be directly checked and the results of the test will likewise indicate the condition of the

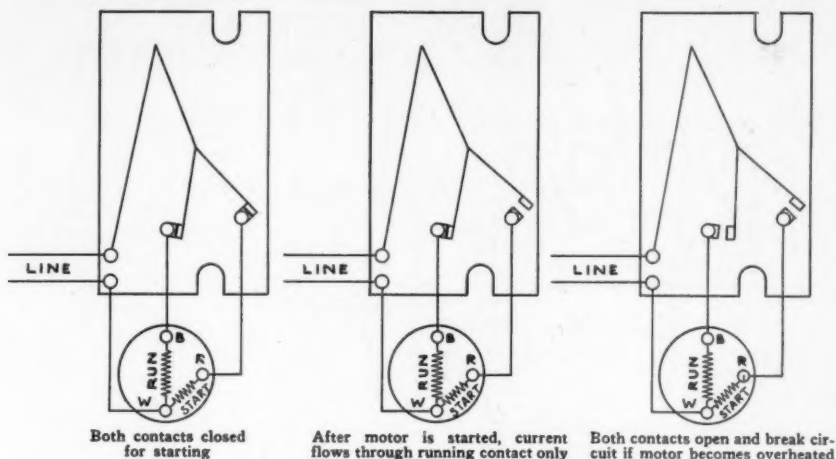


Fig. 8—Operation of Delco relay and overload

original relay and condenser on the unit.

The test relay and condenser assembly should be of the same horse power and frequency as the motor in the unit. Do not attempt to test a 1/12 h.p. motor with a 1/8 h.p. relay and condenser and, conversely, do not test a 1/8 h.p. motor with a 1/12 h.p. relay and condenser. Results in each case will be unsatisfactory.

Combination of volt-wattmeters are available at reasonable prices and are necessary for checking the line voltage to the system and the wattage the system draws.

Test 1—Testing Wall Outlet

Insert test lamp into wall outlet and touch test points together. If lamp does not light, outlet is "dead" and there is no current supply to refrigerator.

Remedy: Check house wiring to determine where current supply is broken. Check for burned out fuse.

Test 2—Testing Voltage to Refrigerator

Install a volt meter in the service line at refrigerator. If voltage varies greatly from rating on specification plate, unit may not run due to overload in relay overheating and stopping motor; unit may refrigerate poorly or in erratic manner.

Remedy: Have Power Co. correct condition; or, if voltage is constant but excessively high or low, use transformer.

Test 3—Testing Control Circuit

Disconnect refrigerator cord from wall outlet. Remove relay and condenser from

unit base and expose wiring terminals.

Plug test lamp into wall outlet and touch test points to white and red leads from control cord.

Test lamp should light with cold control in "On" position and should not light with cold control in "Off" position. If lamp remains lighted in both "On" and "Off" positions, the wiring is shorted. If lamp fails to light when control is turned to "On" position, the wiring is open.

Remedy: Correct short or change wiring.

Note: If control bellows has lost its charge, the contacts will fail to close and circuit will remain open.

Test 4—Testing Operation of Motor

Remove the refrigerator cord from the wall outlet and disconnect the unit leads from the motor terminals. Connect the motor leads of the test relay and condenser to the correct motor terminals and insert the test plug into wall outlet. Test relay and condenser should be in correct upright position.

If motor fails to start, it is inoperative. If motor starts, but overload device in relay breaks the circuit, the motor is stalled or overloaded.

Remedy: Inoperative motor. If motor fails to start, the unit must be changed.

Stalled motor. If the cause of a stalled motor is of minor extent, it is sometimes possible to free the motor by jarring the unit. If this method fails, the unit must be replaced.

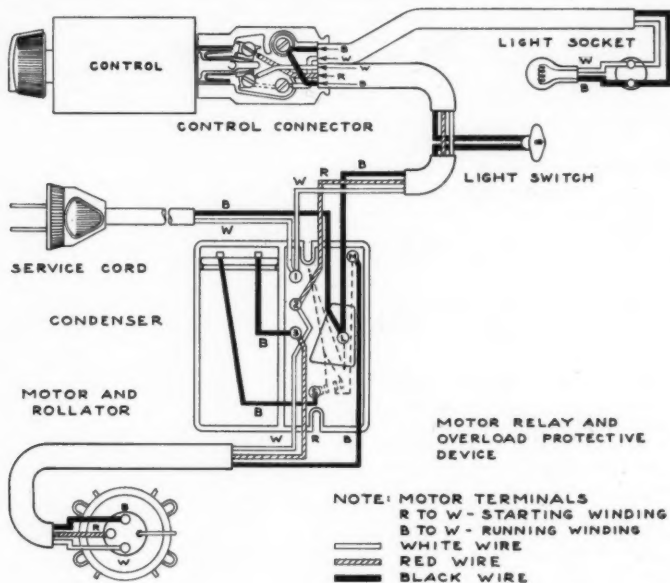
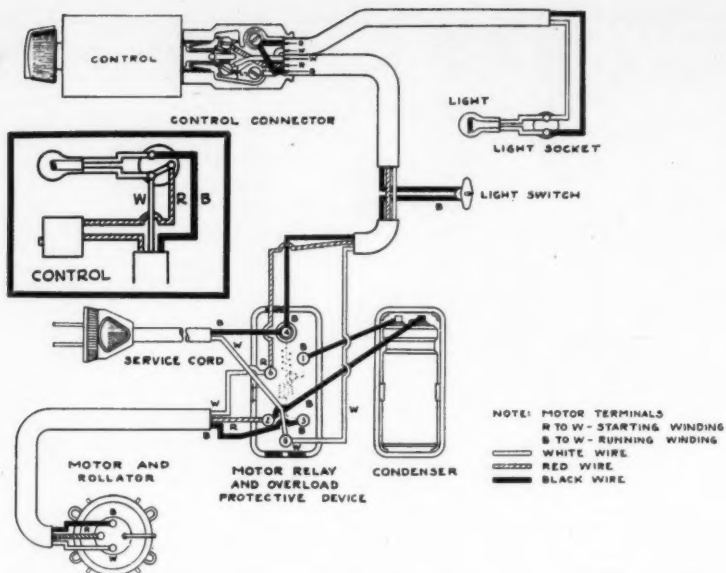


Fig. 9—Top—1939 wiring diagram with G. E. relay and condenser. Bottom—1939 wiring diagram with Delco relay and condenser

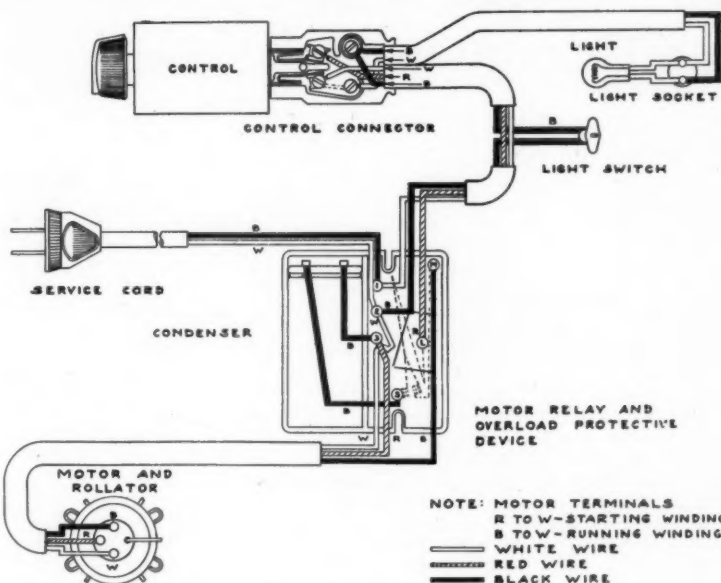
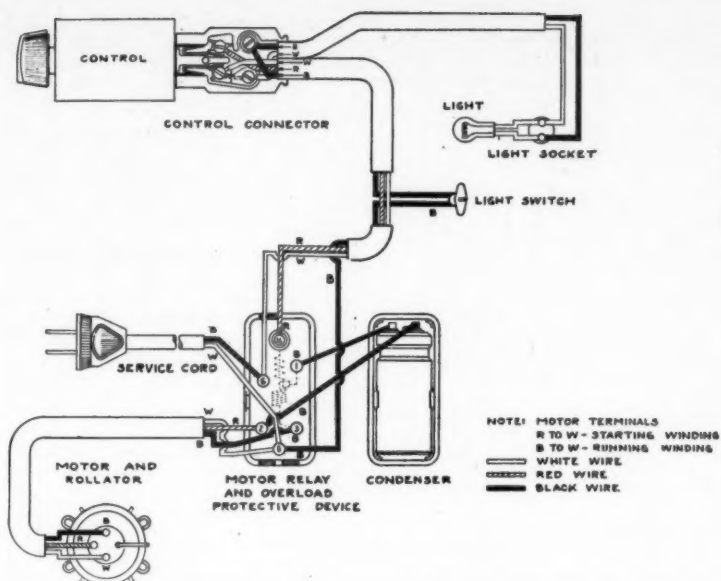


Fig. 10—Above—1940 wiring diagram with G. E. relay and condenser. Bottom—1940 diagram with Delco relay and condenser. Note: For models with light in cooling unit, see Insert Fig. 9



Fig. 11—Test lamp

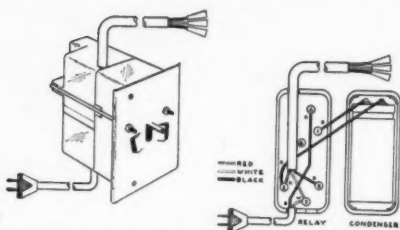


Fig. 12—Relay and condenser wired for test assembly

Overloaded motor. An overloaded motor may be caused by improper ventilation as outlined previously, or, the motor may be overloaded internally. To check the latter, install a wattmeter in the line.

If motor draws more than 25% above watt reading in table 3, motor is overloaded and system should be changed.

Table 3—Average watts.

ROOM TEMPERATURE	AVERAGE WATTS	
	$\frac{1}{8}$ H.P.*	$\frac{1}{12}$ H.P.
70°	98	142
90°	103	151
110°	113	168

* 8 cu. ft. models only.

Test 5—Testing Relay and Condenser Assembly

If motor runs satisfactorily with motor connected directly to the wall outlet through the test relay and condenser, the source of the trouble must be in the original relay and condenser assembly. All other parts of the circuit have been proved satisfactory by Tests 1 through 4.

Remedy: Change original relay and condenser.

(Concluded)

Refrigeration for Food Counters and Salad Pans

CALCULATING the load on a refrigerated food counter or salad pan presents a confusing problem because there is so little concrete data one can use as a basis of calculation. Usually, in refrigeration applications there is a definite space to be cooled to a definite temperature and with this starting point it is possible to calculate the heat leakage into the space and thus determine the size refrigerating plant required.

The only information one has to work from in this application is the number of square feet of shelf or salad pan area required, the maximum temperature of the surrounding air and the estimated shelf temperature required. In view of the many possible difficulties and unknown factors to be encountered, this information is certainly little enough to begin on.

A certain amount of reasoning, however, together with some facts and figures gained from experience make it possible to arrive at a fairly accurate estimate of the load.

Careful observations are necessary and full advantage must be taken of all the information obtained.

The depth of the refrigerated pan below the counter top will depend upon its applications. The cafeteria, for instance, may require a pan on nearly the same level as the counter for displaying trays of butter, cold meats and plates of salads. The display of bottled milk and cold drinks, such as iced tea, may require a pan four inches to six inches deep.

For the display of foods which do not require much height, better results will be obtained if there is at least one inch space from the top of the food to the top of the counter. This one inch space acts as a guard against the cold air being swept away from the top of the food by any movement of air over the top of the counter. It also provides a well in which the heavier cold air has a tendency to remain. On the other hand, very little refrigeration will be extended more than four inches above the bot-

tom of the pan, irrespective of how deep the pan is, unless it travels by conductance through the food counters or the food itself. There is very little natural circulation of air upwards from a cold surface.

The type of construction most frequently used is shown in Fig. 1 and known as the frosted surface type. It is, perhaps, the most easily constructed and experience has shown that it provides the most satisfactory performance. The pan is usually made of

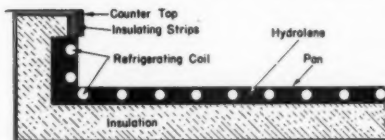


Fig. 1—Construction of frosted type display counter

16- or 18-gauge stainless steel or Monel Metal. The sides are bent up and lock-seamed to form a water-tight pan approximately four inches deep. A drain is provided in the bottom of the pan for cleaning. The coil is attached to the under part of the pan and constructed of $\frac{1}{2}$ -inch tubing bent on $1\frac{1}{2}$ -inch centers with two rows of tubing on either side of the pan. Tubing is usually coiled back and forth on the length of the pan. Fig. 3 shows the method of forming this coil. If the pan is constructed of Monel metal or stainless steel, the tubing should be spaced $1\frac{1}{2}$ inches between centers because wider spacing will result in uneven cooling of the surface and very likely unsatisfactory cooling of the display products. If the pan is made of copper, the tubing can be spaced as much as two inches apart because copper is a better conductor of heat and the tubing, therefore, does not have to be so close together.

After the copper tubing has been soldered to the bottom of the pan and the pan construction completed, the entire under surface is covered with asphalt compound to a depth of about $\frac{3}{4}$ of an inch. The asphalt is smoothed off to form a flat surface so that insulation will fit closely to it. Insulation is then applied to the bottom and sides of the pan to reduce heat losses and prevent condensation on the sides and bottom of the pan. Three inches of insulation on the bottom and at least two inches on the sides is required. A space large enough to contain the expansion valve and liquid line connections to the coil should be provided in the insulation at the back of the salad pan. This space will be approximately

14 x 6 x 8 inches. The outside of the insulation is sealed against moisture by a thin layer of asphalt and an outer pan covers the entire construction.

Control of the refrigerant in the coil is obtained by a thermostatic expansion valve. The bulb is clamped to the suction line where it leaves the pan. The valve is adjusted so that no frosting occurs beyond the salad pan and unless a heat exchanger is provided, a length of tubing should be used as a drier coil. This drier coil can be placed between the bottom of the pan and the insulation. The frosted pan surface is usually maintained at a temperature of 24°F . and the back pressure setting of the pressure control should be set accordingly.

The salad pan in most installations is built in as a part of the display or serving counter. The top of the counter may be stainless steel or Monel metal and the counter is built around the salad pan. An insulating strip, or breaker strip, is used to separate the cold metal of the salad pan from the warmer metal of the counter top. The breaker strip will not only reduce the heat leakage, but prevents sweating of the counter top. The construction as described is illustrated in Fig. 1. Ordinarily, the salad pan is used only during the periods in which meals are served and for this reason need not be refrigerated twenty-four hours a day. This type of pan has the advantage in that

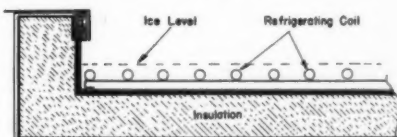


Fig. 2—Ice surface counter

it can be cooled to its desired temperature in a very short time and is therefore adaptable to service during any hours of the day required. It will be advantageous to the restaurant or cafeteria to shut off the salad pan during the longer periods when it will not be in use. For example, a restaurant serving noon and evening meals could turn off the refrigeration for the pan at the end of the evening meal and turn it on again approximately one hour before the time it is to be used on the following day, thus it would have an idle period of at least twelve hours.

A packless diaphragm hand valve when installed in the liquid line provides a convenient means of turning the refrigeration

off and on if the salad pan is in multiple with other equipment.

Another type of pan frequently used is made so that a layer of ice can be frozen on the bottom of the pan. The coils for this type of construction are on the inside of the pan instead of the outside as in the case just described. The refrigeration load is higher with this type of pan because of the ice to be frozen. Generally, the construction of the pan is the same as in the previous case

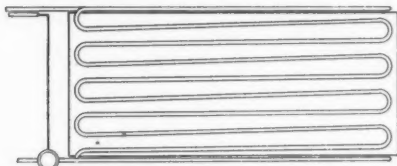


Fig. 3—Construction of coil for frosted pan

with the exception that the coils are on the inside of the pan and should be supported approximately $\frac{1}{2}$ inch from the bottom as shown in Fig. 2. A plug will have to be provided in the drain so that water can be retained in the pan for freezing. The same type of control will be used and the control will be installed in exactly the same manner, however, since water is to be frozen and maintained as ice, the average refrigerant temperature will be 0° to 5° F.

The water level in the salad pan should be $\frac{1}{2}$ inch over the top of the coils, making approximately $1\frac{1}{2}$ inches of water in the pan. To prevent dishes from freezing in the ice, a perforated metal sheet or a wire tray, similar to a refrigerator shelf, may be placed directly over the ice and the dishes placed on the tray.

Construction of Coil

The method of determining the size and length of tube required to construct the coil is as follows:

Knowing the width and length of the salad pan, the total length of the cooling coil required can be determined. The length should be figured assuming that the tubing will be spaced on $1\frac{1}{2}$ inch centers or 2 inch centers depending upon the material used to make the pan and adding an additional amount for the sides and the drier coil. The refrigerant temperature will be 16° F. for the frosting surface pan or 5° F. for the iced surface type, therefore, the average refrigerant temperature at which the unit will operate may be selected from the type

being used. If the equipment is to be operated for twenty-four hours a day, the refrigerating unit will be selected on a fourteen-hour basis. If the service is to be intermittent or, in other words, turned off part of the day, the unit will be selected on the basis that it will run a large percentage of the time while the pan is in use. Consideration must be given to the fact that the condensing unit must have ample capacity to refrigerate the pan during the heaviest load conditions.

If the salad pan is to be used twenty-four hours a day, determine the refrigeration load based on the unit operating fourteen hours a day. This may be calculated after the area of the salad pan is determined. In this calculation, use the average maximum room temperature to determine the refrigeration load.

If the refrigerating equipment is to be turned off part of the day, determine the refrigeration load used, maximum room temperature and load condition and select a refrigerating unit that has approximately 10% additional capacity. The length of tubing required for the pan is determined by the size of the pan itself. The next problem is to determine what size of tubing will give the best results. Knowing the capacity of the condensing unit to be used, the length of the refrigerant coil required and the average operating refrigerant temperature, the size of the tubing that will operate best can be selected from Table 2.

Table 1. Load Per Square Foot of Pan Surface.

ROOM TEMP.	FROSTED PAN B.T.U./Hr./ Sq. Ft.	ICE SURFACE B.T.U./Hr./ Sq. Ft.
80	67	90
85	75	100
90	82	110
95	90	120
100	97	130
105	105	140
110	112	150

Because it is not always possible to use the size tubing that will meet the requirements perfectly, it is often necessary to compromise on a size that will do the best job. On large pans, where the length of tubing will require a $\frac{5}{8}$ inch or larger coil it is suggested that $\frac{1}{2}$ -inch tubing connected in parallel be used if possible. On smaller pans where $\frac{3}{8}$ -inch tubing may be used for the cooling coil, the tubing should be spaced on one-inch centers for stainless steel pans and $1\frac{1}{2}$ -inch centers for copper pans.

Table 2—Direct expansion copper tube coil. Proper tube size, capacity, maximum series length and desirable refrigerant velocity range.

Maximum Series Tube Length in Feet ¹																						
Capacity of Coil in 1000 B.t.u./hr.																						
Copper Tube Size	Refr. Temp.	0.7	0.8	0.9	1.0	1.25	1.5	1.75	2.0	2.25	2.5	2.75	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	8.0
1 3/8"	30					100	71	53	40	31												
	20				119	76	53	39	30													
	10			106	86	55	38	28														
	0			96	75	61	39	27														
	-10	86	66	52	42	27																
1 1/2"	30							290	225	175	145	120	100	75								
	20						300	215	165	130	105	90	75	55								
	10					300	210	155	120	95	75	65	55									
	0					340	215	150	110	85	65	55										
	-10					235	150	102	75	60	45											
	-20					220	135	158	100	70	50	40										
	-30	160	140	124	100	65	45	35														
1 5/8"	30													265	195	155	130	105	90			
	20													310	250	195	145	115	95	78		
	10									310	270	225	180	140	105	85	70					
	0							360	275	220	190	160	130	95	70							
	-10					490	340	250	190	150	130	110	90	60								
	-20					500	330	230	170	130	100	90	75	60								
	-30					330	210	145	105	80	65	58										
2 3/4"	30															280	230	180	150	130	110	
	20															450	340	275	215	170	150	115
	10															440	325	245	200	155	125	110
	0															370	310	230	175	140	110	95
	-10											315	260	220	180	120	95	75	90	68		
	-20											340	270	220	180	150	108	80				
	-30							280	215	170	140	115	95	65								
¹ Copper Tube																						

¹ Copper Tube

² Hard Drawn Copper Pipe

³ Drier Included

Calculations

As an example, consider a frosted type pan 6 ft. long by two ft. wide or a total area of $6 \times 2 = 12$ sq. ft. The maximum room temperature is 90° ; the pan is made of Monel metal and will be refrigerated 24 hours per day.

The spacing of the tubing will be on $1\frac{1}{2}$ -inch centers for Monel metal. The length of

tubing required will be $\frac{24 \text{ inches}}{1.5 \text{ inches}} = 16$

lengths $\times 6$ ft. per length $= 96$ ft. for bottom. Two rows of tubing are required on all four sides. The perimeter of a 2×6 ft. pan is 16 ft., therefore, the sides will require 32 ft. of tubing and the entire coil will require $32 + 96 = 128$ ft.

Referring to Table 1 we note that the load per square foot of frosted pan surface in a 90° room is 82 B.t.u. per hour, therefore, the total load will be $12 \times 82 = 984$ B.t.u. per hr. Based on 14 hours' operation the load

will be $\frac{24 \times 984}{14} = 1686$ B.t.u. per hr. The

refrigerant temperature for frosted type pans will be about 16° F.

Referring to Table 2 we find that with a load of 2000 B.t.u. per hr. and a refrigerant temperature of 16° F. the maximum length of $\frac{1}{2}$ -inch tubing we can use in one coil is 148 ft. Since the 128 ft. of tubing required for this pan is well within the 148 ft. maximum on one coil we find that $\frac{1}{2}$ -inch tubing will be satisfactory.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

REMODELING AN EVAPORATOR

QUESTION 461: I would like a comment from the engineering department about a proposed change in the evaporator of a household refrigerator. A restaurant owner has this box, and he wants the upper refrigerated shelf removed. It is a U-shaped evaporator with the shelf in series. The refrigerant is metered by the highside float into the shelf, which has $\frac{1}{4}$ -inch tubing soldered to the under side. The refrigerant then enters the back and bottom of the main evaporator. The feeler bulb of the control is attached to the bottom of the evaporator.

What change should I expect in the operation of the refrigerator?

ANSWER: The first and probably the most noticeable effect of changing the design of this evaporator would be the slower freezing of ice cubes, and in addition to this, the theoretical effect would be to increase the operating time of the condensing unit and increase the number of cycles per hour. Furthermore, you may have to set the temperature of the evaporator to a lower point in order to maintain the same box temperature.

Actually, however, how much effect will be noticed will depend on how much work this shelf was doing, or in other words, how much it was contributing to the total evaporating space of the evaporator. I note by your let-

ter that you find quarter-inch tubing is soldered to the bottom of this shelf. If this is actually the case, I'd be inclined to believe that the shelf is contributing very little to the cooling area of the evaporator. However, if this statement is an error in writing, and the tubing is actually of a larger size, then the shelf is probably contributing quite a bit to the work done, and the above-mentioned effects would be quite noticeable.

You have not mentioned why you desire to remove this shelf; therefore, I don't know what you are trying to accomplish. However, it doesn't sound to me like a good idea from the standpoint of future operation.

MOISTURE IN SYSTEM

QUESTION 462: I was called to service a Frigidaire beverage cooler, Model BB-258, Cabinet No. 1948084, Unit Model FCIB. I found the evaporator on this job to be leaking badly in several places on the bottom and front of the tank, and the owner suggested replacing this leaky tubing with new copper tubing. This was done, and the unit was tested for leaks at 175 pounds pressure, also with F-12 and a Halide torch; it was found to be free from leaks. This job was then charged with $2\frac{1}{2}$ pounds of F-12 and put into service. It operated all right for about two days, then started operating on

the left half of the box only, freezing it up, and finally refusing to refrigerate at all.

As you probably know, this job has a high side float, with a capillary tube connected to the outlet and soldered to the suction line. When I installed my gauges, I found a vacuum of 20 inches at the suction service valve, and supposed that the job was either low on refrigerant or that the float was stuck closed. I added more refrigerant, found that was not the trouble, so disconnected the capillary tube from the outlet to the float chamber and found that instead of a vacuum at this point, I had a fairly high pressure.

Wondering whether my trouble was moisture, or perhaps a piece of solder, I let this pressure spend itself; then, using a large dehydrator, I forced dry air through the evaporator until it was apparently free. I then installed a dehydrator between the float chamber and the capillary tube, evacuated the evaporator and compressor, opened the outlet valve on the float chamber, and the system started operating perfectly.

Trouble Continues

However, this continued for about two days, then as before, the thing started to operate on one-half the coil only; but this time it would alternate, first one half, then the other half, until finally it just doesn't refrigerate. The unit was shut off for about twelve hours, then plugged in, and the darn thing started to work again for a short time, then as before, started alternating and finally quitting almost entirely.

When the compressor stops there is a hissing sound in the float chamber which can be stopped by closing the outlet valve, but other than this, there is no evidence of a leak of any kind that I can find. The float and condenser are new, having been installed about two months ago.

ANSWER: In my opinion, the trouble on this Frigidaire beverage cooler is due to moisture, and the serviceman has the choice of doing one of two things to overcome it. The quickest way, but the most expensive, is to blow out the entire charge of refrigerant and use whatever means he has at hand to dry the system as much as possible.

One suggestion would be to circulate carbon tetrachloride through the system, then recharge with fresh refrigerant. In doing this, it would also be necessary to change the oil in the compressor, flushing out the crank case with carbon tetrachloride to remove any moisture or sludge that may have accumu-

lated there. The installation of the dryer then, of course, would be necessary.

The other method would be to use a series of dryers, leaving each on for a period of approximately two days, or as experience will show as you go along, an increasing length of time as the moisture is reduced. There is no possibility of determining how many dryers may have to be put on, or how many will have to be replaced, inasmuch as there is no way of knowing how much moisture the system contains. It may require as many as ten.

I think the location of the dryer indicated by the serviceman used at the present time is satisfactory. Freeze-up, in all probability, will always occur in the capillary tube since the outlet of this tube is the beginning of the expansion point.

The hissing noise at the float chamber is probably natural to the system. Where these floats are installed with a capillary tube as the liquid line to the evaporator, a certain reserve is held in the float chamber during the operating period, and for a few minutes after the machine is shut off, there will be a continued flow of refrigerant through the valve to the evaporator. This flow will probably cause the hissing noise mentioned.

MILK COOLER TOO SLOW

QUESTION 463: I have a milk-cooling problem and am wondering if you can give me any information that will aid me in making a satisfactory job.

This job consists of a brine tank inside a 4-foot by 6-foot by 7-foot walk-in cooler. This brine tank is 60 inches deep, 20 inches wide, and 42 inches long; it holds approximately 220 gallons of calcium chloride brine mixed two and a half pounds to the gallon. The coil now used is an old Frigidaire flooded coil with large copper plates soldered to the tubes for fins. This coil is hanging in the brine and is refrigerated with a 1-h.p. Frigidaire, using SO₂ as the refrigerant.

This arrangement cools the milk satisfactorily but keeps the machine running 24 hours a day to keep the brine cold enough. At present, the customer is cooling approximately 80 gallons of milk twice a day. In my estimation, the compressor is large enough for the job, but the coil is very inefficient the way it is being used, and the machine has to operate at too low a back pressure to be efficient. I might add that the milk is being cooled to around 40 degrees at the start of cooling.

My suggestion was to wind two coils from

1/2-inch copper tubing, each being 100 feet long, and to use two thermostatic expansion valves. It seems to me that by having that much coil submerged in the brine, the back pressure should materially increase, thereby giving the machine greater capacity. At present the machine runs on 10 and 12 inches of vacuum, and the brine never goes below 25 degrees. It is hard to hold a satisfactory box temperature with this brine temperature.

I would like very much to have your opinion as to whether I am figuring enough coil, or whether it is too much; also as to the best way to wind a coil for this shape of tank.

ANSWER: You have not given me enough information concerning this refrigerating system to make any calculations of the heat load. Some of the additional information I would need is: 1. What is the desired temperature of the walk-in cooler? 2. Are the eighty gallons of milk being cooled by an aerator, and how long does it take to run it over the aerator? In other words, does the customer run this milk through in a period of one half hour, one hour, or exactly how much? 3. What temperature is the milk before it is run over the aerator? Does the refrigerating system cool it from cow temperature, or is water used in the first stage of the aerator? From what temperature does the refrigerating system have to cool the milk, and what is the final temperature of the milk required?

I note by your letter that your brine solution is mixed two and a half pounds to the gallon, and that the suction pressure on the machine at the present time is ten to twelve inches vacuum. A brine solution for this type of work, and with such a low operating back pressure, should be at least three to three and a half pounds per gallon. This would give you a freezing temperature of the brine of around minus twelve degrees. With your present mixture, I am inclined to believe that the brine is freezing around the coil, which would set up an insulating blanket against the transfer of heat from the brine to the refrigerant. This, in turn, would account for the low suction pressure you are forced to maintain and the rather high brine temperature obtained. It is very possible that if you will strengthen this solution, or mix a new solution to the proportions I have stated, your troubles will be somewhat overcome.

There is the additional possibility that there is too much oil in this system, or that the float chamber of the coil has a heavy

blanket of oil floating on top of the refrigerant. The proper calibration of the float should overcome this and would result in better operation of the float and a higher suction pressure.

Inasmuch as I am unable to calculate the total heat load on the system, I can only generalize in this respect, but a one-horse-power unit will ordinarily handle in the neighborhood of 8,000 B.t.u. per hour, and therefore, using as a basis of my calculations a K factor of twelve for bare tubing submerged in still brine, and a temperature difference of fifteen degrees between the brine and refrigerant, you would require about forty-four square feet of tubing surface, or about 200 lineal feet of 3/4-inch tube.

I wouldn't advise installing anything smaller than 3/4-inch tube, since your pressure drop through such a length of tube would be too great, and it is entirely possible that one expansion valve would handle 3/4-inch coil of this length satisfactorily, whereas two expansion valves would be required on a 5/8-inch tube.

\$\$\$

POWER CURTAILMENT ORDER EXEMPTS REFRIGERATION PLANTS

A RECENT order from the Office of Production Management outlined a drastic power conservation program designed to assure full and uninterrupted operation of defense plants in the Southeast section of the country despite a serious power shortage. This order affects large commercial and industrial users in seven states.

The situation was brought about by lack of water for generating plants. The interesting point about the order is that certain vital defense industries and a limited number of essential civilian services are exempt.

Among the seven groups of consumers that are listed in the order as being exempt from the mandatory curtailment provision are: federal, state, county and municipal services; fire, police and essential state and highway lighting.

Next in order considered essential community services are: churches, hospitals, newspapers, refrigeration and food preservation plants.

It is interesting to observe that the Office of Production Management has in this order recognized the very essential service that refrigerating plants and food preservation plants render in this emergency and their importance to the morale of the nation.

COMMERCIAL

INCREASE BUSINESS BY
DOING A MORE EFFEC-
TIVE JOB OF SELLING

Selling

Defense Boom Brings Increased Refrigeration Farm Market

"Cash and Carry" Service Plan Keeps Costs Down and Profits Up

By B. K. Anderson

Arkansas firm finds timely service program establishes confidence in rural areas, which builds up prospect list for later sales of refrigeration.

"YOU can't get 'city prices' for refrigeration service in rural areas and still keep your customers coming back; neither can you afford to drive miles over rough roads to fix a refrigerator at the price most farmers believe equitable; so, the only solution that the small town firm has for this problem is to put his business on a cash and carry basis."

This is the opinion of W. C. Scott, who, with C. H. Watson, owns and manages the Rogers Electric Company, Rogers, Arkansas.

Mr. Scott is quick to point out that in recent years service and sales have blended to mean the same thing in Ozark Mountain area merchandising. He explains:

"Most of the refrigeration in the homes in the 'backwoods' country is one of two types: mail order, or second-hand. The latter is bought entirely on a price basis

from a dealer who took his trade-ins away from his own area to be rid of service and kick-back worries. In the case of the new mail order refrigerators, service has usually been handled by sending the unit back to the dealer. But the old trade-ins have become the district's service firm's worry.

"Now, because these farm owners have been thoroughly acquainted with the loss of time and inconvenience of sending their unit back to the mail order house for adjustment, and because they have found there is more to buying satisfactory refrigeration than simply getting any old box at as low a price as possible, the small town refrigeration service man is about to have *his* day."

According to the most recent reports of the Department of Agriculture, most rural areas are now experiencing their best year on a farm-market-price basis, and, with the war boom on, the Department is convinced that there will be more farm-dollars spent in the months to come.

What this means to Mr. Scott is that these small town firms which have been getting only a minor part of their rural

area's refrigeration dollars in the past, are now in their best position to achieve a major portion of this growing market.

How this balance of trade can be shifted from out-of-town, and often out-of-state, sources to the home service and merchandising firm he explains by pointing to his own company's program.

Most important in Rogers Electric's opinion is creating a favorable first impression. "Advertising and sales promotion in a small town and rural area is largely what 'they' are saying about you. Most of the people in the district know each other and their experiences form the basis of their conversation. If you do one job in an area that satisfies, it will lead to a dozen more.

"Therefore, you can't afford to get the reputation of being too high-priced on your service; you can't afford to charge higher prices than they expect to pay for the work; and the only way we have found to keep the prices down is to have them bring the refrigerator to our shop.

"This plan is advisable because it cuts our service cost at least in half, due to no lost time and expense in running around the country, and we well know that a refrigeration unit can be repaired most speedily in the shop.

Has Sales Advantage

"It also furnishes us our strongest sales advantage. For, once the customer is in our building he comes in contact with new and more modern refrigerators. He is having trouble with his old unit, and is therefore in the best frame of mind to trade it off."

For these reasons, this firm works almost entirely on a "cash and carry" basis, Mr. Scott explains. If the customer calls about refrigeration breakdown he is immediately invited to bring the unit to the shop and it is explained to him that by so doing he will greatly lessen his costs. Of course, this paves the way for the vital opening wedge in rural sales, personal contact.

Refrigeration service (which at first did not seem important to the farm prospect, through mail order inconvenience, and the

unreliability of low-priced used refrigerators), becomes the one most important factor in his mind in considering refrigeration. His confidence in the local service firm is gained because the company is "right there at home" to stand behind its work and merchandise, and because they did not over-charge him for their work.

In other words, he is brought to realize that it is his local firm that has his interest most fully in mind, and more thoroughly understands his needs and desires. Thus, through service, the local firm is placed in the most advantageous position to further merchandise the refrigeration needs of its area.

Has Educational Problem

According to Mr. Scott, "In the Ozark and adjoining mountain areas the one big sales problem is educating the prospects to refrigeration. Generally speaking, these areas are of low income. Small farms and homes without a major share of modern conveniences. A vast majority of the homes have never used any type of refrigeration, so the problem is to teach them its necessity in modern living."

Rogers Electric does this by concentrating on a district at a time. The best prospect for home refrigeration is picked out and all efforts are pointed on selling him. The idea is to get at least one good refrigerator in a home in all the surrounding districts for it is these units which sell the customer's neighbors.

Time and again this plan has proved out, Mr. Scott says. "One sale in an area seldom fails to lead to several more within the following weeks. Unlike many other areas, we know that our strongest sales point is that we're right here at home where we can fix anything.

"We have found that Service and Sales now mean the same thing to our prospects, so we concentrate on selling them the service. We use it for our initial contact and our closing sales argument. It is the one factor that carries the most weight in rural sales."

It is also the opinion of the Rogers Electric Co. that few small town refrigeration service firms in areas similar to theirs can

exist without something to sell beside service. For this reason, the firm carries a complete line of electrical equipment, and seldom makes a service contact without pushing some of its other appliances to the fore. Through this added merchandising provided by the service contact, the firm is able to gain extra dollars that are a

strong factor in helping to keep service charges down to what the customer expects to pay for the work.

"It's good will and service that set the stage for rural sales," Mr. Scott says. "That's why we know our best possible first contact with the customer is service that builds good will."

Complete Maintenance Service Contracts

Versus

Oiling Maintenance Contracts

By Lucius S. Flint

Is the service company ever justified in selling the apartment house owner an oiling and inspection service contract? Read what the experience of E. L. Fabian has been.

"If you want to build up maintenance business that really pays dividends in the long run, forget about oiling and go into the complete service operation!" Such is the suggestion of E. L. Fabian, head of the General Refrigeration Co., Los Angeles, who has built up an extremely profitable apartment house business.

Because there is a certain amount of price resistance to a contract which covers the complete maintenance operation, Fabian a number of years ago experimented with the oiling service and inspection setup. But on finding that customers didn't feel they were getting their money's worth, Fabian instantly dropped the system and started promoting complete contract maintenance.

Today, he has built up this volume to a point where it comprises a good share of the total. It's profitable business and what's more, it represents the best advertising any refrigeration service man can have, Fabian has found.

The Los Angeles service man's charge for complete maintenance is 25 cents per refrigerator on apartments having 20 or more housing units. When he takes a contract on this basis, Fabian assumes full responsibility for keeping the refrigerators in that apartment in working condition. No matter what goes wrong, he's responsible for fixing it.

Of course a volume operation is absolutely essential if the operator's to make any money on this basis. You can't "come out" on actual service costs until you've built up a string of at least 100 refrigerators, according to Fabian. But from that point on, the law of averages takes care of the need for profit. Once they're placed in condition, the majority of apartment refrigerators cause relatively little trouble. When one unit occasionally does give a lot of grief, the income from the many other sources over-balances that one heavy item of expense.

"Much the same principle applies here as in the insurance business," Fabian points out. "In taking a maintenance contract, the user is insuring himself against possible heavy maintenance expense. Naturally, there's a certain element of a chance involved. He may go on for years paying the monthly main-

tenance charges and never have any trouble. Then, all of a sudden, he'll have a string of bad luck which would normally cost a big piece of money. But under the contract setup, he pays nothing extra. He's been paying us in advance for just such an emergency—in the same way as you'd pay on a life or accident insurance policy.

"Because we do have a large volume, the law of averages takes care of our profits. You have to figure that you'll lose money on a setup of this kind for the first year—simply because it takes at least that long to build up any substantial volume. But once you've developed a good string of contracts, they'll pay your overhead and a whole lot more. With this contract business, we keep our men busy the year around and thus are able to maintain a good crew for handling rushes when they arrive. Because our accounts are well scattered, the apartment house service can be mixed in with other work very profitably—calls in the same neighborhoods being handled at the same time.

Hard to Sell But More Satisfactory

"I'll admit that in many cases it's hard to sell a maintenance service which costs as much as ours does. But we intend to stay in business and consequently, we're thinking in terms of the 'long pull' rather than immediate revenue. We could go out any day and sell untold numbers of oiling service contracts on a two-dollar a month rate per apartment house, as has been done in many cases. Each one of those contracts would yield us a revenue of \$24.00 a year—a revenue earned by little more than sticking your head in the door of the apartment once a month.

"But we don't consider that sound business. After all, when a customer pays out \$24.00 a year, he expects something for his money. Of course from a time standpoint you may actually earn your money on oiling and inspection service. But the customer doesn't feel that way about it. When you have charged him \$2.00 a month for a year or so, doing

nothing more than oil the equipment, and then something of a major nature goes wrong, he expects you to take care of it. When he finds you can't—that he's been paying out that money for nothing but oiling and inspection—he's naturally upset and you've lost a customer.

Comparative Charges

"We have to charge from six dollars to seven dollars and fifty cents per month on an average apartment—as compared to two dollars or so. But when an apartment owner has been paying two dollars a month and feels he hasn't really gotten anything for it, he's more than willing to go the difference for an absolutely complete service. Here's what happens. You get one apartment on this type of contract and take good care of it. If that property owner happens to have other housing units, he'll soon put them on the same type of contract. If an agent is involved, you may get a dozen big apartments from one source. Once you've proved yourself, agent and owner alike will recommend your contract plan. Our business has been built up almost entirely on this basis.

"I'll admit that there's some nice 'gravy' to be had in the sale of oiling maintenance. And, if you can sell it and be honest about the thing, letting the customer know that he's paying for nothing more than oiling, well and good. But on any other basis, it's a losing game in the long run. And when the customer understands fully that he's paying two dollars a month to have his equipment oiled, you're not going to get very far in making such a sale."

Frank J. Keenan,
Pennsylvania.

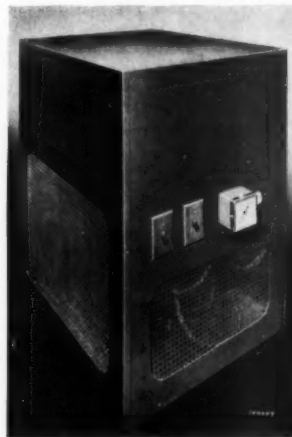
The May issue of THE REFRIGERATION SERVICE ENGINEER seems to have been lost in the mail, as I have not received it, and our mail carrier, who is very dependable, has not been able to locate it in the Post Office here. Will you please send me another copy if one is available, as I do not feel that I can miss even one issue. There is so much of interest and information in each issue to us servicemen, that it is really invaluable.

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Refrigeration in Welding

DESIGNED to increase productivity of resistance welding equipment in welding of aluminum and stainless steel, a line of refrigerating units for welding machines is announced by Progressive Welder Company, Detroit.



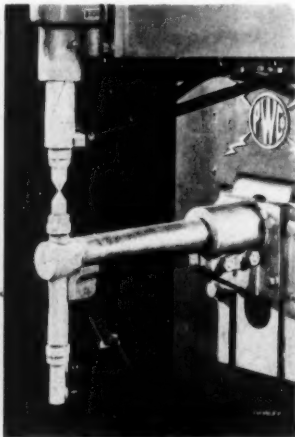
Welding at sub-freezing temperatures! To increase productivity of aluminum and stainless steel welders, Progressive has developed a line of refrigerating units shown here applied to an aluminum welder.

While intended to still further increase the productivity of Progressive aluminum and stainless steel welding machines, the refrigerating units (patent applied for) are available for other makes of welding machines in view of their potential importance in de-

fense for speeding and improving the welding of aircraft assemblies, etc.

Believed to be the first time "Refrigerated Welding" has been made commercially available, the unit makes possible continuous welding of four to ten times as many spots in aluminum without requiring point dressing.

When used in combination with a spot welding machine, the unit reduces electrode temperature to a point where—in spite of the high heat necessary to produce a weld—electrodes will be continuously covered with frost. This reduction in tempera-



The new refrigerating unit for resistance welding is generally available to help speed Defense production of airplanes. The unit may also find application for cooling of industrial coolants, cutting oils, etc.

ture has so increased point life that 10 minute runs, continuously, at 100 welds per minute without point dressing are not unusual for the combination of a Progressive three-phase aluminum welder and the new refrigerating unit.

Primary function of the refrigeration is to keep the welding point cool at the point of contact. In resistance welding heat is generated at three primary resistance points, these being: (1) at the point of contact between the pieces being welded together, (2) at the point of contact between the "upper" piece and upper electrode, and (3) between the "lower" piece and the lower electrode.

Only the first of course is desirable, the other two tending to soften and permit deformation of the electrode tip—also producing pick-up, by alloying of the tip with the material being welded.

Experimental production to date indicates a complete elimination of pick-up when the refrigerating unit is used, particularly on the Progressive Aluminum and Stainless Steel Welders, for which a new harder and tougher tip material than generally available was developed some time ago. Retention of tip shape by preventing softening is also reflected in the maintenance of higher current density at the weld.

The unit can also be used for welding other types of material besides aluminum and stainless, and may also be applied to the cooling of industrial coolants, cutting oils, etc.

The new units are available in a range of three sizes, designed respectively for use with (1) a single Aluminum Welder, (2) two welders, and (3) a bank of four such welding machines. The units are provided with automatic thermostatic control, all standard safety appliances, built-in dehydrator, heat exchanger, external indicating thermometer, highest efficiency pump with variable pressure, etc.

Peculiarly enough, while the refrigerating unit absorbs a considerable amount of heat, experience indicates that welding machine settings are actually lower than when operating with water cooling. The lower setting of the heat control generally required is probably due in part to the high-

NOW THE MOST IMPORTANT SIGN IN YOUR TOWN,—

because...

Defense has opened up entirely new markets for you, and the government has given you the necessary priority to get the equipment.

And remember that the priorities you get are absolutely essential for the materials we must get!

The refrigeration service engineer is looked upon in this emergency to keep the nation's storehouse of perishable foodstuffs in good operating condition.

In addition to the demand for your services in army camps, naval barracks, aboard ships and other military and government installations, commercial refrigeration parts for repairs are now available to you by means of the OPM Priority Rating No. A-10.

If you are not familiar with its provisions, your wholesaler can undoubtedly explain it, or write us for a copy of Preference Rating Order No. P-22. (Amended)

FEDDERS MANUFACTURING CO., INC.

BUFFALO, N. Y.



**JOHN SMITH
REFRIGERATION
SERVICE
ENGINEER**

New and Improved Appliances

er conductivity of copper at the lower temperature.

Installation of the refrigerating unit is quite simple. Being self-contained, it is necessary in most cases only to disconnect the water-lines to the electrodes and couple the refrigerator unit inlet and outlet connections to the electrode water piping.

Bonney Socket Set

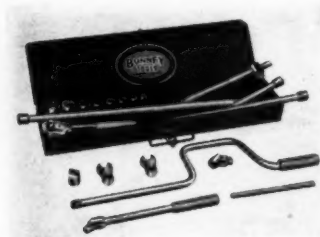
ONE of the recent additions to the Bonney line that is proving extremely popular with service men in all branches of industry, is the new No. TD12 socket set.

Containing 20 strong, lightweight pieces for making practically any combination desired, each one is made of Bonney "CV" chrome-vanadium steel in the popular $\frac{3}{4}$ inch square drive.

It includes a full set of sockets with $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $1\frac{1}{4}$, and $1\frac{3}{4}$ inch double hexagon openings; universal joint; 6, 12 and 17 inch extensions; $\frac{1}{2}$ and $\frac{3}{4}$ inch crowfoot attachments; $17\frac{1}{2}$ inch speeder; drag link socket; $8\frac{1}{2}$ inch hinge handle; 6 inch cross handle; 7 inch reversible ratchet and 8 inch "T."

Every piece is carefully heat treated to bring out the ultimate strength of the steel and provided with a lasting, rust-resistant finish.

The set is packed in a strong, attractively finished



metal box.

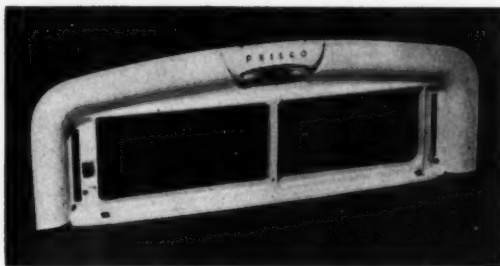
Full details may be had by writing direct to Bonney Forge & Tool Works, Allentown, Pa.

Plastics in Refrigerators

AN insulating frame of pure white Lustron, Monsanto polystyrene plastic, used on the 1941 Philco refrigerators won a top award in the Major Household Ap-

sign. Color and finish are inherent in the plastic, and the smooth flowing lines of the frame are molded right in at one operation. This modern plastic material is tough and strong even at low temperatures and neither harsh cleaning, food acids, or prolonged exposure to moisture can destroy its beauty.

The prize-winning insulating frame as well as the freezing unit door used on



pliance classification of the sixth annual Modern Plastics Competition.

This frame, the largest piece ever injection molded of plastics, has spotlighted a trend toward plastics in modern refrigerator cabinet de-

smaller Philco models, is molded by the Thermo-Plastics Division of the Standard Products Company, St. Clair, Michigan, of material supplied by Plastics Division, Monsanto Chemical Company, Springfield, Mass.

Saran to Replace Copper

WITH all copper under strict allocation through a ruling of the Office of Price Administration and Civilian Supply, The Dow Chemical Company has announced that a flexible, semi-transparent tubing of thermoplastic Saran is available as an alternative for copper and other metal tubings.

Developed through years of research, this tough, chemically resistant tubing may be used in many applications previously demanding copper except where high temperatures and very high pressures are encountered. Also, Saran tubing has been tested and proved suitable to replace such strategic materials

as nickel, stainless steel, copper and ceramics in several fields where its unusual properties are advantageous.

Saran is characterized by unusual toughness and resistance to moisture, brines, solvents, acids and alkalis. Another feature of this plastic material is that it may be used for short periods of time at temperatures of two hundred and fifty degrees to two hundred and seventy-five degrees Fahrenheit, although its strength and resistance are somewhat reduced at these elevated temperatures, Dow laboratory experts announced.

Available in sizes one-eighth inch to five-sixteenths inch outside diameter with wall thicknesses varying from .030 inches to .062 inches, this tubing may be joined by Parker Standard Tube Couplings and S.A.E. or other flare type fittings. Already the Mueller Brass Company of Port Huron, Michigan, is developing fittings for Saran tubing which permit the construction of a tubing system in which contact between

New and Improved Appliances

such fittings and the material conveyed is entirely eliminated.

Saran tubing joined with "B" Parker Standard Tube Couplings withstood a pressure of fifteen hundred pounds per square inch without rupturing or leaking. In a fatigue test Saran was flexed through an angle of fifteen degrees, one thousand seven hundred and fifty times per minute for two million five hundred thousand cycles without failure, while standard one-quarter inch copper tubing failed after about five hundred cycles in the same test.

This indicates that Saran tubing would be superior to copper tubing for those applications where excessive vibration is encountered.

With the use of copper prohibited to non-defense industries, the introduction of Saran tubing permits maintenance of production in some instances where the lack of copper might have serious economical effect.

New Protective Metal Coating

A NEW metal coating compound, marketed under the name of Amco Metallic Coating Powder, Brand "K" has been developed by the American Solder & Flux Co.

This new product is designed for making repairs to damaged tin coatings. While the finished coating has the appearance of tin and matches perfectly with the surrounding hot dipped tin coating, it has an advantage not possessed by the original tin. AMCO Brand "K" Coatings are completely rust resistant and will protect the underlying iron or steel to the same extent as hot dipped zinc coating of the same thickness. This unusual and important property of the AMCO Brand "K" Coating is due to the fact that when in contact with iron or steel in a corrosive medium, it is electro-positive and therefore affords

protection against rust and corrosion.

The material is intended for use wherever an original tin coating has been damaged in handling, worn away through use or burned away in a welding operation. Since the melting point of the Brand "K" is lower than that of tin, the original coating is not melted or disturbed in any way by the application. The coating on the repaired

areas joins with the undamaged surrounding areas of tin, forming a continuous and protective surface.

Since the finished job looks the same as the tin, Brand "K" may be used wherever appearance is a factor. It is quite satisfactory for use on those surfaces of food containers which do not come into direct contact with the food itself. For all other forms of damaged tin coated equipment, it is the only product available which may be expected to make a satisfactory repair.

Ansul Safety Record

INJURY rates for chemical plants in 1940 averaged 6 percent higher in severity than for 1939, reports the National Safety Council. This compares unfavorably with a reduction of one percent average of severity for all industries. The same source reports injury rates for chemical plants in 1940 an average of 10 percent higher in frequency.

mon thing. The success of the safety program is due primarily to the suggestions and constant supervision of the Safety Committee which is elected by the plant employees.

The awards displayed in the group picture are those presented to the Ansul Chemical Company by the National Safety Council and by the Employers Mutual Insurance



Members of the safety committee elected by employees of the Ansul Chemical Co. With them are the awards made for more than four consecutive no accident years to the company.

In comparison with the increased frequency of accidents for the Chemical Industry, Ansul Chemical Company of Marinette, Wisconsin, manufacturers of refrigeration gases, has a plant performance of 50 consecutive months of accident free operation to date. This operation covers 525,262 man hours.

Prior to the start of this period, accidents were a com-

pany in recognition of this fine record.

Willis McNeely,
Dublin, Georgia.

I am a very enthusiastic reader of THE REFRIGERATION SERVICE ENGINEER. Particularly the Question Box, which is intensely studied each month.

Amended Parts Order for Repair and Maintenance

SINCE the issuance of the original Preference Rating Order No. P-22 covering repairs, the Office of Production Management has amended the order. The new order is dated October 16 and is titled "Repairs, Maintenance and Supplies." The original order and its interpretation appeared in the October issue.

A bulletin recently issued by the Refrigeration Service Engineers Society outlines the coverage of the amended order and the probabilities of a further supplementary order covering retail outlets in the same manner that wholesale concerns are now thoroughly covered in the securing of parts for repairs and maintenance.

R.S.E.S. Special Bulletin

Washington, D. C., Oct. 22.—On October 16th the Office of Production Management issued an amended Preference Rating Order P-22 covering repairs, maintenance and supplies. This superseded the original order of September 9, 1942, which bulletin was mailed to you. This original order is published in full in the October issue of our Official Organ, THE REFRIGERATION SERVICE ENGINEER, with interpretations as to what it covered.

In some respects the amended P-22 order is broadened for securing parts for the repair and maintenance of plants engaged in

- (a) manufacturing, processing or fabricating;
- (b) warehousing—maintaining warehouses for storage or distribution of any material;
- (c) wholesaling—acting as a distributor of products sold to manufacturers, wholesalers, retailers or other persons, not consumers.

It is evident that this order restricted in some measure the interpretation of the former order, in that it specifically *did not* provide for the large field of retail stores using refrigeration equipment, such as, meat markets, milk stores, restaurants, grocers and others engaged in the distribution of perishable foodstuffs in which refrigerating equipment is a vital necessity.

Your secretary immediately communicated with the local OPM office without success and endeavored to secure a fair interpretation by phoning Washington. This was not successful and therefore a personal call in Washington was deemed most advisable.

I have been informed under the present order that parts for the repair and maintenance of existing refrigeration equipment in *wholesale plants*, such as, meat packing plants, cold storages, dairies, locker plants and other wholesalers using refrigeration equipment are entitled to such parts if the order is endorsed by the refrigeration service man when given to his jobber as follows:

"Material for Maintenance, Repair or Operating Supplies—Rating A-10 under Preference Rating Order P-22 as amended, with the terms of which I am familiar."

This endorsement must be manually signed. It is specifically stated that the terms "maintenance," "repair" and "operating supplies" do not include material for the improvement of a property, additions or expansion. Records as provided by the original order must be maintained for examination.

It is well to check with your jobber to ascertain whether it is necessary to use this endorsement on all material requirements as in some instances he may be receiving some supplies without the requirement of a preference rating. Your secretary was cautioned to inform our members that all orders of OPM will be "policed" and infraction will be dealt with as provided by law.

IMPORTANT

My principal reason for a personal trip to Washington at this time was to make representations against the discrimination of the order against retail outlets which comprise the bulk of our members' business. I repeat the order would be of little benefit in the food preservation program so essential in this national emergency, if the proper channels of retail food distribution were not protected, outlining again that the experience and training of the refrigeration service man was of fundamental importance in contributing to the welfare and morale of the nation.

I am pleased to report that a supplemental order is expected to be issued soon, probably in 2 to 4 weeks that will provide the same coverage for parts and supplies for existing plants in retail stores as is now provided for wholesale plants. This order I am hopeful may include domestic refrigeration.

I am sure you will be interested in learning too that the Office of Production Management is using some of the information in the preparation of this order as contained in the brief presented by the Society in its first contact.

EMERGENCY INVENTORY

I have been informed also that as provided for in the original P-22 order, service organizations may apply for an "emergency inventory" of the actual parts and supplies carried on their service trucks in making service calls and which they deem essential to meet a contemplated emergency. Each service operator or organization must determine from past experience the *minimum* requirements for such "emergency inventory" and indicate this specifically on his order to his jobber or supplier.

COPPER

In an order issued October 21st the OPM has ordered a drastic reduction in the supply of copper. This curtailment is restricted until January 1, 1942, when supplementary orders may be issued. The order contains a list showing the types of products which will be severely curtailed among which is air conditioning equipment, but does not mention refrigeration equipment.

CONCLUSION

It is my impression that those responsible in the Office of Production Management, Refrigeration Unit, are cognizant of the necessity and importance of the application of refrigeration equipment in the food preservation program. They have been frank in telling me that they hope the refrigeration service and maintenance field will demonstrate their ability in the present emergency in maintaining one of the country's principal lines of defense.

Your association expects to be in constant contact with the proper authorities and to keep you currently informed. Remember "Defense Needs Refrigeration." Food cannot wait.

You can help by telling the story of the importance of refrigeration to every customer.

Now too is the time to encourage every service engineer to affiliate with the R.S.E.S. The dues are a small investment to have his interests properly presented to the government.

Yours very truly,

H. T. McDERMOTT, Secretary.

Copper Conservation Order

IN an order issued October 21 by the Priorities Division of the Office of Production Management No. M-9-C, the use of copper in certain items was curtailed so as to insure deliveries for defense and essential civilian requirements. Drastic reductions in the manufacture of non-essential items using copper or copper base alloy are effective until January 1, 1942 and after that date, with few exceptions, no manufacturer of any of the approximately 100 items listed may use copper in the manufacture of their products.

Such non-essentials as jewelry, gifts, novelties, house furnishings, dress accessories, burial equipment, building supplies, hard-

ware, etc., are some examples of the items included.

While air conditioning equipment was included in the original order (except small moving parts and bearings) in an amended order of November 1, this section was changed to read as follows:

"Air conditioning equipment (except for essential food storage and transportation and industrial processing where and to the extent the use of other materials is impractical)."

This heading is included under the general classification of building supplies and hardware.

This order does not refer to refrigeration equipment.

Air Conditioning and Refrigeration Industry Submit Report to OPM

SUB-COMMITTEE No. 4 of the Industrial Advisory Committee to the Air Conditioning and Refrigeration Section, OPM, submitted its report which is designed to provide curtailment of between 35% and 50% in the total production of the air conditioning and refrigeration industry by eliminating non-essential applications to assure production of equipment for essential defense and civilian uses.

The committee report is as follows:

Subcommittee No. 4
(Priorities, Ratings, and Allocations)
Appointed by
Office of Production Management
To Represent the
Air Conditioning and Refrigeration Industry

Washington, D. C.,
October 22, 1941.

Office of Production Management,
New Social Security Building,
Washington, D. C.
Gentlemen:

We herewith present a program for a curtailment of between 35% and 50% in the total production of the air conditioning and refrigeration industry, by eliminating non-essential civilian uses.

Already our effective part in the Defense Program is being seriously hampered by the inability of our industry (industrial and commercial) to obtain necessary materials. We shall briefly explain why and offer constructive suggestions for your consideration.

Refrigeration is the process of lowering the temperature of a substance by mechanical, chemical, or physical means.

Air conditioning is the process of controlling the conditions of air as regards temperature, humidity, circulation, ventilation, and cleanliness. In summer, this includes refrigeration to reduce temperature and to reduce the moisture content of the air. In winter, it includes heating to increase temperature and humidifying to increase the moisture content of the air.

Divisions of Industry

The industrial and commercial air conditioning and refrigeration industry (*excluding domestic refrigerators*) may be grouped into three broad divisions:

- (a) Refrigerating and air conditioning machinery.
- (b) Fixtures (cabinets, cases, and other fixtures).
- (c) Accessories and parts.

The above will hereinafter be referred to as the "AC&R industry."

The undersigned committee has been selected by the OPM as representative of the entire AC&R industry, including the remote branches. This committee includes responsible members of all three divisions; it enjoys the confidence of all branches and has the right to speak on their problems. Evidence of this fact is the vital and not-previously-available information supplied, at the request of this committee, for 163 companies, large and small, representing practically 100% of the AC&R industry (Appendix I).

The size of our industry and the extent to which it affects almost all other industries, as summarized in Appendices I and II, will no doubt surprise those who have not previously had occasion to be informed.

The AC&R industry is now doing an average of 39.9% defense work using our normal line of products. A few examples are: industrial air conditioning for production of munitions, vital chemicals, synthetic materials, control of atmospheric conditions in producing precision instruments, engines,

et cetera; refrigeration for naval and other ships, cantonments, et cetera. (Appendix III gives more detail.)

In addition, those of the companies in our industry which have suitable facilities have taken substantial contracts for special defense work such as artillery pieces, gun mounts, machine guns, field kitchens, sheet metal work, and numerous other items.

The AC&R industry produces machinery, parts, fixtures, and accessories for applications ranging from large installations involving thousands of horsepower, all the way down to small machines of fractional horsepower. All sizes and types have some applications for defense requirements. This large range of types and sizes naturally involves production facilities of great variety.

The AC&R industry is thought of at times, by some people, as being largely concerned with producing equipment of the non-essential—or even luxury—class, easily done without in times such as the present. Only to a small extent is this true, because by far the larger part of the industry's normal peacetime production is devoted to essential uses for the basic life of the country. In wartime these essential civilian uses are the foundation for the Defense Program itself. For example: Refrigeration is essential for the processing, transportation, and distribution of foodstuffs, providing palatable drinking water in hospitals and factories, producing synthetic rubber, et cetera; air conditioning increases the quantity and quality of blast furnace iron production and is essential for processing textiles, chemicals, certain medicines, et cetera. (Appendix III gives more detail.)

Although it is true that years ago this country thrived without the benefit of mechanical refrigeration and air conditioning, today the great urban concentration of people and modern production methods have developed ways of living and processes of manufacturing which are dependent upon refrigeration and air conditioning.

Many defense plants have been built, and many more are in process of construction, at points where there has been little population in the past. Housing is being provided by governmental and other agencies; but to serve these new concentrations of people, stores and markets must follow and refrigerating and air conditioning equipment must be made available. If proper living facilities are not provided, population shifts are difficult, costly, and delayed. Equipment for such installations is of the same importance to national defense as equipment for the training camps, which now carries preference ratings. To quote from a letter from the head of a large dairy-products company:

"The importance of milk in the diet of both the civilian and military population of this Country engaged in all-out defense effort is being repeatedly emphasized by Government sources. We are supplying not only workers in civilian industries but camps of the U. S. armed forces with large quantities of fluid milk. We are receiving increasingly large orders for deliveries of evaporated and dried milk to United States and British Governmental agencies. However, in the face of this increase in demands on our productive capacity, we are now encountering difficulties in obtaining refrigerating machinery because of the priority situation with respect to many of the materials necessary for the fabrication of this equipment."

A large number of AC&R factories are situated in small cities or towns, and a substantial proportion of the residents of such communities directly or indirectly earn their livelihood from these factories. A major portion of the workers employed in manufacturing, installing, and servicing the products of our industry are highly-trained specialists in their particular field.

We now have no means of obtaining quantities of materials, such as copper and steel, needed for the essential civilian uses. Members of our industry have been exerting considerable ingenuity toward developing substitutes for the scarcer materials. Efforts in this direction will continue; however, technical considerations definitely limit the extent of such substitutions.

We do not claim that all uses of our products are necessary during wartime, and we feel that unnecessary uses should be curtailed. We want to be realistic; we have voluntarily made sacrifices and will gladly make further sacrifices where advantageous to our country. However, we maintain that the best interest of the Defense Program, and the basic life of the country, will be served by enabling us to obtain needed materials for essential uses.

The requirements of the Navy, Army Maritime Commission, and other governmental agencies for our industry's products will continue to be not only of very large volume but also of the greatest urgency as to speed of production and delivery. Unfortunately, we are able to anticipate only a small part of this need by building equipment in advance, because it is not possible for the above-mentioned departments of the government to give us, in advance, the detailed information that is essential before we can place much of this highly-technical equipment in production. The result is that we are given information and orders in spasmodic rushes—and because many vitally-important things hinge on the speed of production and delivery we are able to attain, it is necessary for us to throw our organizations and facilities, overnight, into each emergency.

It is impossible to expand and contract, at will, industrial organizations such as those represented in the AC&R industry which are, in the main, composed of highly-skilled engineers and mechanics of many years' specialized experience. The same statement applies, of course, to special tools and manufacturing facilities.

Our production of equipment for essential civilian uses would have the further advantage of enabling us to retain our skilled and technically-trained personnel; thus we would be able to do a better job on our direct defense work.

Now, however, we are faced with the paradox of the government's making it impossible for us to do the very thing which the government itself most desires and needs us to do.

The Office of Production Management has invited us to make suggestions. Therefore, we propose the following simple plan, which should be effective in minimizing the use of critical materials and yet be relatively easy to administer:

Appendix II lists uses of refrigerating and air conditioning equipment for each basic industry of the country. Appendix III explains, in more detail, for just what purpose the equipment is used. Since there are so many different applications of air conditioning and refrigeration (industrial and commercial), there are necessarily many sizes and types of standard equipment produced, as well as

special designs to meet particular needs. Because of the varying demand for any one size for essential and non-essential uses, it would be impracticable to curtail production by means of a quota based on sizes or types. It should be relatively easy, however, to decide that certain basic industries which require air conditioning or refrigeration are essential or nonessential in the present emergency, and then to determine that the function of air conditioning or refrigeration is either necessary or not necessary for the particular industry. In Appendix II, we have indicated our objective opinion as to the degree of essentiality of each use.

The Committee's Plan

- (a) The Office of Production Management would determine those civilian uses of air conditioning and refrigeration which are "essential," "less essential," and "non-essential." The method of making this determination might be along the lines which we have suggested in Appendix II.
- (b) A blanket rating (A-3 is suggested) that is high enough to permit the obtaining of materials, such as copper and steel, would be assigned to our industry for the "essential" civilian uses.
- (c) A blanket rating of A-3 might also be assigned for the obtaining of materials to anticipate production requirements for "defense uses," limited simply to the minimum inventories needed for production schedules. This would eliminate the requirement of the complicated PD-25 defense supplies rating, which has proved almost impracticable for our industry. The production of equipment for direct defense uses and the production of equipment for essential civilian uses should proceed together, in order that production schedules may be arranged efficiently. The manufacturer should be able to obtain materials to anticipate production requirements for both, under the same supplies rating plan. A manufacturer cannot operate effectively unless he knows how much material he is going to get and when he will be able to get it.
- (d) A lower blanket rating might be assigned to enable the obtaining of more limited quantities of materials for those uses determined as "less essential" civilian uses.
- (e) A preference rating order would be issued for the granting of preference ratings needed to obtain supplies to anticipate production requirements for the filling of orders for the "essential" and "less essential" civilian uses and "defense uses."
- (f) For those uses determined as "non-essential," as suggested in Appendix II, no preference rating would be given.
- (g) Our industry would undertake the responsibility of closely supervising and of policing the uses of such materials, in conformity with the law. Further, it would, by affidavit, guarantee that materials obtained under the respective preference ratings would be applied only to the authorized uses.

Resulting Reduction

Because of the great variation of equipment and types of applications covered by our industry, any curtailment formula for our industry would, at best, be extremely complicated and probably impracticable. We believe that the above program would obviate the need for a curtailment formula.

It is estimated that such a program would result in a curtailment of between 35% and 50% in the total production of our industry for civilian uses. Based on the production of our industry for the 12 months ending August 31, 1941, and allowing for increased demands for "defense uses," there should be a net reduction of at least 20% in raw materials required.

We are certain that we can, effectively and legally, control the use of our products, and we will gladly provide any reasonable guarantee as to usage which may be required.

Copies of this letter are being sent to those in OPM with whom we have discussed various aspects of our industry problem.

We respectfully ask for action. What we need more than anything else is a tangible program which will enable us to keep our skilled personnel together and allow us to produce equipment for essential civilian and defense requirements.

Very truly yours,

OPM Subcommittee No. 4

Air Conditioning and Refrigeration Industry
(Industrial and Commercial)

James A. Bentley, Discussion Leader,
(302 South Geddes Street, Syracuse, New York)
W. C. Allen L. C. Love
F. H. Faust P. A. McKittrick
C. V. Hill, Jr. R. H. Pearse
M. W. Knight A. B. Schellenberg

Appendix I

Statistical Information Concerning the

Air Conditioning and Refrigeration Industry (Commercial and Industrial)

I Persons employed at August 31, 1941

(a) Factory and office employees.	34,825
(b) Field personnel; engineering, construction, service, sales..	86,365
(c) Secondary employment required to provide for item V estimated as	42,000
(d) Approximate total employment (persons)	163,190

II (a) Annual payroll for I(a).....	\$ 58,227,666
(b) Annual payroll for I(b).....	140,315,650
(c) Annual payroll for I(c) estimated as	58,800,000
(d) Approximate total payroll.....	\$257,343,316

III (a) Manufacturers' total orders booked, 12 months ending August 31, 1941	\$202,784,164
--	---------------

Note: This represents only the manufacturers' selling price of factory products, with the exception of certain complete installations made by some manufacturers.

(b) Additional costs, including local labor, locally-purchased materials, freight, etc., and installers' profit, not reflected in III(a) or V; estimated at	364,176,246
---	-------------

(c) Total installed cost to users for 12 months ending August 31, 1941, estimated at.....	\$566,960,410
---	---------------

IV (a)	Total manufacturers' unfilled orders at August 31, 1941...	\$ 63,011,301
(b)	Percentage of (a) covered by DEFENSE ORDERS	39.9%
V	Total purchases by manufacturers from others of raw materials, fabricated and semi-fabricated parts, for 12 months ending August 31, 1941	\$ 94,962,815
VI	Floor space occupied (sq. ft.)	15,350,134
VII	Quantities of principal materials used during 12 months ending August 31, 1941:	
(a)	Steel (tons)	102,457
(b)	Iron (tons)	42,567
(c)	Copper and copper alloys (tons)	14,153
(d)	Brass (tons)	6,310
(e)	Aluminum (tons)	1,671
(f)	Nickel and nickel alloys (tons)	1,193
(g)	Lead (tons)	847
(h)	Zinc (tons)	794
(i)	Tin (tons)	783

Note: This information has been compiled from confidential data supplied for 163 companies. It covers practically all companies, both large and small, in all branches of the air conditioning and refrigeration industry (commercial and industrial). Returns were received from all questionnaires sent out, with only two unimportant exceptions. It may be conservatively stated that the figures are better than 98% complete. The figures are factual with the exception of those stated as estimated. Such estimates as have been made are conservative.

(EDITOR'S NOTE: Following the preceding matter was attached Appendix IIA classifying air conditioning equipment as essential civilian uses, less essential civilian uses and non-essential uses. This list is similar in its treatment as that of refrigerating equipment which follows, identified as Appendix IIB).

Appendix IIB

Refrigerating Equipment

ESSENTIAL CIVILIAN USES

CHEMICALS (Manufacturing Processes*)

DRUGS AND PHARMACEUTICALS (Manufacturing Processes*)

DRY ICE (Manufacturing Processes*)

EXPLOSIVES (Manufacturing Processes*)

FOODSTUFFS

Processing* of Foodstuffs

Meat and Meat Products Packing or Processing*

Dairy Products Processing*

Vegetable and Fruit Processing*

Baking Processing*

Miscellaneous Foods Processing*

Quick Freezing

Transportation of Foodstuffs

Railroad Car Refrigeration

Truck Refrigeration

Ocean and Inland Ships Refrigeration

Precooling

Distribution of Foodstuffs

Preservation, Storage, and Sanitation Equipment for

Storage Warehouses

Wholesale Depots

Retail Stores

Eating Places

Locker Storage

HOSPITALS AND INSTITUTIONS

Food and Medicine Preservation

HOUSING

Commercial

Stores

Hotels

Industrial

Factories

Offices

Laboratories

Institutions

Hospitals

ICE

Production

Storage

LABORATORIES

MORTUARIES

PETROLEUM PRODUCTS (Processing*)

RUBBER AND RUBBER PRODUCTS (Manufacturing Processes*)

SYNTHETIC PRODUCTS

Plastics

Synthetic Rubber

Unclassified

TRANSPORTATION

Railroad Cars

Ships and Boats

LESS ESSENTIAL CIVILIAN USES

FOODSTUFFS

Processing* of Foodstuffs

Ice Cream (Production and Distribution)

Beverages

Candy Processing*

HOUSING

Public

Public Buildings

Unclassified

Institutions

Educational

Unclassified

PHOTOGRAPHIC MATERIALS (Manufacturing Processes*)

Film

NON-ESSENTIAL USES

FLOWERS (Growing and Sale of)

FURS (Storage)

HOUSING

Residential

Apartments

MALT BEVERAGES (Beer, Ale, etc.)

RECREATION

Bars

Soda Fountains

Clubs

Skating Rinks

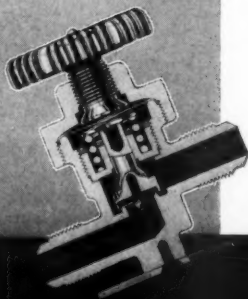
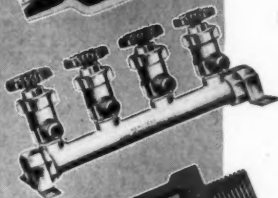
Unclassified

* "Processes" or "Processing" denotes operations for which equipment is essential for purposes of controlling chemical, biological, or other reactions of given hygroscopic and non-hygroscopic substances, materials, or products. Whenever improved efficiency, health, and comfort of workers also results, this is purely an incidental additional advantage.

Attached to the report was a list of typical industries involved in defense or essential civilian work for which refrigerating and air conditioning equipment is necessary for the purposes as listed.



Cited for Outstanding Service



Throughout the history of mechanical refrigeration and air conditioning, the name KEROTEST has been closely identified with progressive leadership and full cooperation with your industry's policy of bringing maximum quality within the scope of every purse.

In the very beginning, KEROTEST established a high standard of quality and dependability in Kerotest Valves and Fittings that has continued unflinching and preceded every new change in design . . . until TODAY Kerotest is cited by complete acceptance of the industry and broad usage on nearly every leading brand of equipment.

Today's critical period of priority purchasing is curtailing our production for your industry; but 'though Kerotest Valves and Fittings may be limited in number . . . you can be certain that the same high standard of quality that brought Kerotest's acceptance will continue without sacrifice or substitute.

Today's wary buyer is conscious of the possibility of receiving unknown substitute materials in new service parts and installations. In your installations and service work, keep the reassuring evidence of quality and dependability . . . genuine Kerotest Valves and Fittings.

KEROTEST
MANUFACTURING COMPANY
PITTSBURGH, PENNSYLVANIA

Congressional Committee Hears Refrigeration Industry Needs

EMPHASIZING what dislocation may occur in all branches of the industry, not to mention the essential service provided the nation in this present emergency, a committee representing the various components of the business appeared before the small business defense committee in Columbus, Ohio, on October 21, to solicit their influence in seeing that the business secures a high preferential rating. The committee consisted of George Taubeneck, Publisher, Air Conditioning and Refrigeration News, Detroit, Michigan; Herman Spoehrer, Spoehrer-Lange Company, St. Louis, Missouri; H. G. Bogart, Toledo, Ohio and Les Blough, White-Rodgers Electric Company, and G. E. Graff, Ranco, Inc., Columbus, Ohio. A prepared statement, signed by H. G. Bogart, Jr., Toledo, Ohio; Frank H. Langsenkamp, Indianapolis, Indiana, and Herman Spoehrer, was read into the committee record by Mr. Spoehrer. In presenting the report the committee stated, "We come to you, as our representatives at Washington, to plead for relief from further drastic, arbitrary and un-

sound limitations imposed on our businesses by the OPM and to point out the very necessary and vital role which refrigeration plays in the health and efficiency of America." The report went on to state, "In operation throughout our country there is an estimated \$5,000,000,000 worth of domestic and commercial refrigeration equipment (retail value) and an estimated \$400,000,000 worth of air conditioning installations.

"This equipment is our basic means of preserving, transporting, processing and merchandising the perishable foods of our country. The air conditioning installations in operation are essential to the habitation and continued occupancy of the buildings in which they are installed.

"Yet the cost of the actual steel, brass, copper, zinc, nickel, rubber and other restricted metals for the maintenance of all of the household and commercial refrigeration and air conditioning equipment now in use in the nation does not cost more than the estimated dollar per year per thousand dollars worth of equipment to be maintained."

REMA Holds Fall Meeting

Important Conference Attracts Largest Membership Meeting. Priorities—Taxes Discussed by Principal Leaders. Convention Plans Go Forward. More Exhibit Space Disposed of at This Time of the Year Than Previous Exhibits.

WHITE Sulphur Springs, West Virginia, was the Fall meeting place of the Refrigeration Equipment Manufacturers Association on October 6-7-8. The first day's sessions were devoted principally to committee meetings of the association and on Tuesday the formal business of the association got under way.

Herbert B. Trix, Detroit, presided as session chairman. President E. A. Vallee, Milwaukee, reported on the various work that the association had been doing in Washington to secure a preferential rating for refrigeration equipment parts and supplies. He acknowledged the splendid work that was done by several of the committee members in their frequent trips to Washington and gave a brief resume as to what the industry was facing relative to the allocation of a sufficient supply of materials to provide the requirements that will be needed.

Among the subjects discussed by Mr. Vallee was the fact that too many people had little conception of what the refrigeration market consisted of and that he felt

it should be the duty of the association to publicize the industry which made the preservation of foodstuffs possible. As an example, he pointed out how many consumers recognized, when they visited their neighborhood meat market, restaurant, grocery or drug store or other similar place, the equipment that provided the temperatures which preserve and conserve their food. He suggested the association should consider this subject very carefully even to the extent of providing some method whereby a trades relation department might be instituted.

"Designing for Alternative Materials" was the subject of a paper given by Thos. A. Bissell, Society of Automotive Engineers, New York, who outlined in his paper with the use of steroptic slides the steps which the motor car manufacturers are taking to conserve the use of critical materials. Interesting statistics were provided to show how the adoption of the use of these alternative materials will release critical materials.

Chairman Trix called upon L. F. Blough, St. Louis, to present his report entitled



HERE'S WHAT YOU'LL SAY

WHEN YOU TRY
White-Rodgers
CONTROLS

Indianapolis, Indiana

White-Rodgers Electric Company
1203 Cass Avenue
St. Louis, Missouri

Gentlemen:

We take a very real pleasure in sending you this unsolicited testimonial with reference to the quality of your controls.

For your information we have tested and tried practically every refrigeration control on the market and our engineering department reports that after exhaustive tests and trials the White-Rodgers Control comes most nearly to meeting the strict requirements and specifications of our products and installations.

We find that your control is most accurate and also has a closer differential. We also find that it is easy to adjust and set due largely to the visible dial reading.

We have standardized on White-Rodgers Controls on all installations and our experience as indicated above indicates that your control most certainly does meet the strict requirements of commercial refrigerator usage.

Yours very truly,

R. J. Blank*

*The name of the author of this unsolicited testimonial will be furnished on request.



TYPE 1629

Selective range control. Total range 20° to 75° F. from which any 10° may be chosen for user adjustment. External lever—visible dial marked 1-2-3-4-5.



WHITE-RODGERS ELECTRIC CO.
Controls for Refrigeration • Heating • Air-Conditioning
1203k CASS AVENUE, SAINT LOUIS, MISSOURI



"Something Definite on Catalog Standards." Mr. Blough prefaced his remarks by stating that this subject had been under consideration for several years and that he hoped that at this convention the work of the committee would be brought to a successful conclusion. He stated that the recommendations of the committee had been presented to the Board of Directors of the National Refrigeration Supply Jobbers Association and with few minor suggestions had been approved by their board.

A specimen catalog sheet accompanied the report to illustrate the recommendation that the committee proposed. The report and recommendations were adopted with minor changes.

At 6:30 P.M. the annual banquet was held with Robert LeBaron, West Norfolk, Va., as Toastmaster. The evening was devoted principally to one of getting better acquainted.

Defense Work—How to Get It

On Wednesday, Chairman Trix announced the first paper as "Government Defense Work—How to Get It," by G. E. Graff, Columbus, Ohio. Mr. Graff, in a very able manner, outlined the procedure in which plants may secure government defense work and reiterated his opinion that inasmuch as the government is the largest single purchaser in the world today of commodities, it would be most advisable for every executive to consider how best he could secure a portion of this business. The government, as he stated, was widely interested in putting at work every piece of productive machinery and it was his opinion that securing this government work was the same type of a sales job the manufacturer was accustomed to in his civilian practices.

Excise Tax on Refrigeration

One of the most important subjects of the meeting was naturally "The New Excise Tax on Mechanical Refrigeration" by Attorney Hammond E. Chaffetz, who endeavored to outline the complexities of the present tax system as it applies to commercial refrigeration. It was his opinion that the

A group picture of all but eleven of those who attended the Rama Fall meeting in White Sulphur Springs, West Virginia, October 6-7 and 8.



ON GUARD... ANSUL RESEARCH

Ansul has long been proud of its Research Department, proud of the exacting way in which it has stood guard over the quality of Ansul products.

But Ansul research men have done more than that—they have constantly sought to make Ansul products better, to check fully into the performance of these products, and to give technical aid and information to Ansul customers, as well as to the whole industry.

SEVEN ORIGINAL ANSUL RESEARCH PAPERS AVAILABLE ON REQUEST

- Corrosion of aluminum with methyl chloride
- Refrigerant driers
- Corrosion of metals by wet refrigerants
- Separation of wax from oil-refrigerant mixtures
- Methyl alcohol in refrigerating machines
- Pressure drop in suction and liquid lines
- Sludges

ANSUL CHEMICAL COMPANY
MARINETTE, WIS. RS-27

ANSUL **SULPHUR DIOXIDE • ICE-X • METHYL CHLORIDE**
AGENTS FOR
KINETIC'S "FREON-12"
LET THE ANSUL JOBBER NEAR YOU SERVE YOU BETTER



REMA EXHIBITION COMMITTEE

C. H. Benson, Chairman, Imperial Brass Mfg. Co., Chicago; J. W. Hatch, President, Bush Mfg. Co., Hartford, Conn.; R. M. Van Vleet, Mgr. Refg. Sales, Cutler-Hammer Inc., Milwaukee, Wisc.; R. H. Luscombe, Sales Mgr. Penn Electric Switch Co., Goshen, Ind.; W. D. Keefe, Sales Mgr. Fadders Mfg. Co., Buffalo, N.Y., was absent when picture was taken.

provisions of the recent tax law covering the subject of refrigeration were in the form of an amendment to the law that was passed originally in 1932, but was made all-inclusive to not only include household refrigerators, but commercial refrigeration as well, and had been extended to another five year period until 1945. It is expected that proper interpretations of the law may be secured in a matter of thirty to sixty days.

OPM System of Priorities

Dr. E. E. Pratt, Division of Priorities, OPM, Washington, D.C., whose address on "The OPM System of Priorities and How to Use It" was of utmost importance. Among other things Dr. Pratt explained in most elementary fashion that priorities meant first and foremost in simple language the "putting of first things first." It was necessary, naturally, that priorities should come into being, continued Dr. Pratt, because raw material production is most limited and production facilities for fabricating the raw materials inadequate. Naturally, the priority system is definitely designed to give the army, navy and air forces the necessary supplies which they require and we might as well recognize that in doing this there will be a considerable limitation of civilian requirements and that most of the luxuries and even a large number of necessities will be strictly curtailed. It is anticipated that in 1942 the government will spend thirty billion on direct defense work which represents almost one-half of our normal indus-

trial business. To indicate what we may expect, he stated that at the present time the production of finished products for defense work was only about 10% in the United States, in England about 50% and in Germany about 60%. It is the prime purpose of this government to increase that percentage of their defense production greatly. Frankly, he stated, if you think the situation is now tough, picture that in the next year there will be three to five times as much energy devoted to defense construction.

Dr. Pratt stated two essential things are most necessary on any rating order before it can be properly accomplished. First, the rating number on which the order will qualify and, most important, the delivery date on which the material is actually used to make this preference rating order workable. He summed up some of his talk by stating that the American public may well realize that today priorities are the law of the land and that definite penalties were provided to see that such laws are obeyed.

H. A. Dinegar's Remarks

President Vallee, presiding at the Wednesday afternoon session, introduced Henry A. Dinegar, Chief of the Refrigeration Unit of OPM, Washington, D.C., who has direct supervision of the refrigeration industry. Mr. Dinegar was well-known by many of those present because of their contact with him on frequent visits to Washington. He has a background of refrigeration experience and has a first hand knowledge of the advancement of the refrigeration industry as was indicated in his address. He paid the industry a tribute in the fact that they had achieved the "unachievable" and of the progress the industry enjoyed because of the ingenuity and engineering skill they had displayed. "The industry in 1931-32 was a youngster so that the depression was a new experience, but in spite of this they continued forward," said Mr. Dinegar. Another new experience, he stated, was that the federal government had grown to large business since that time and it was his opinion that the government was closer to business today than ever before. He outlined that a big part of his department work was to see that civilian needs insofar as possible are taken care of, but that these civilian needs might be classified in two parts. First, civilian needs as they apply to actual defense work and, second, normal expanded civilian needs. It is presumed

TIME TESTED AND IMPROVED!



DEHYDRATORS

These new TIME-TESTED Dehydrators have these outstanding advantages:

1. Cone-shaped screen—providing greatly increased separating area. Shape of screen causes particles to settle at base of cone, permitting free passage of refrigerant through center.
2. Pure wool packing inside cone screen—a further protection which traps dust-like particles which may penetrate screen.
3. Improved felt pad between interior cone screen and exterior flat screen.

Most dehydrating agents used in refrigerating systems are continually being sub-divided into smaller or dust-like particles. This may happen through the taking up of moisture, or by abrasion, etc. These particles restrict the capacity of, and sometimes completely clog the disc screens and filters with which the old, or conventional, type dehydrator is equipped, resulting in pressure drop and eventual trouble at the expansion valves.

All Mueller Brass Co. Dehydrators are now provided with cone-shaped screens. This new feature, together with other improvements, provides maximum drying efficiency with minimum pressure drop. There is a right style for every purpose. Write for descriptive literature.

Stocked by leading jobbers everywhere.

MUELLER BRASS CO.
PORT HURON, MICHIGAN
STREAMLINE

TRADE MARK REG. U. S. PAT. OFFICE

MORE EFFICIENT · LESS RESTRICTION · GREATLY INCREASED SCREEN AREA ·

from the best sources that many supplies for civilian use would be short for several years. He stated that he was hopeful that supplies may be eventually allocated to civilian needs without priorities, but that was dependent upon the development of certain situations. However, essential refrigeration equipment will be made, he stated, and essential refrigeration equipment can be classified as that used for the actual preservation of foodstuffs among others. It was definitely certain, as we all knew, that a ceiling would be placed on the manufacturer of non-essential refrigeration equipment.

Concluding the convention several committee reports were presented, among them the Exhibition Committee, Charles A. Benson, Chairman, which reported the progress

that had been made in the sale of convention space, such sale exceeding that of a comparable time last year and that the promotional material is now in the process of being printed and would be available for members' use within the next few weeks. Other committee reports included that of R. H. Luscombe, Goshen, Ind., who reported that the Board of Directors had increased the annual dues to \$200.00 to provide the necessary funds for expenses necessitated by frequent contacts in Washington. Also committee reports of the manufacturers jobbers relations and antiquarian committee were presented.

The Spring meeting of 1942 will be held on May 4-5-6 at the Sea View Golf Club at Absecon, New Jersey.

ALL-INDUSTRY EXHIBITION PLANS GO FORWARD

AT a special meeting of the Board of Directors of the Refrigeration Equipment Manufacturers Association held in Chicago, October 22, to consider the advisability of cancelling the coming All-Industry Refrigeration & Air Conditioning Exhibition, January 12-15 next, it was definitely decided that the Show will go on. It will open in the Stevens Hotel, Chicago, as originally planned on Monday, January 12, 1942, for its usual four-day run.

Greater Need Than Ever for Show

It was pointed out that the need for another of the show's original functions would be greater than ever by January—namely the bringing together in one place at one time everyone of importance in the industry and that only through a set-up such as is possible with a booth show can the contacts between the manufacturers and the members of the trade be made in an orderly and efficient manner. All manufacturers, participating as exhibitors, will have regularly established temporary headquarters in line of the direct travel of the members of the trade who want to see and talk with them. Home office executives, not normally available for contacts with the trade except in their own offices, can be readily found. Show contacts are important to all manufacturers, distributors, jobbers, service men, and others, but are especially so to the smaller operators who cannot afford either the time or expense of visits to home offices

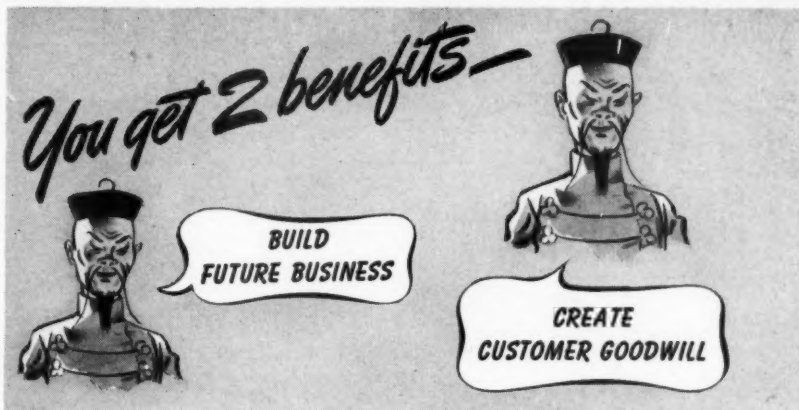
or factories of the manufacturers. Regardless of how tough conditions may be, these members of the trade will be wanting, more than ever, in the opinion of the proponents of holding the show, to see executives from their source of supply.

Not Inconsistent with Public Policy

It also was brought out that holding the show will not be inconsistent with the Public Policy. President Roosevelt's recent statement on the effectiveness of exhibitions as a medium for educating the public in the present government policy was cited—one in which he said: "The vast responsibility of national defense calls for united action by Americans in every walk of life. Because defense measures must be on a colossal scale if they are to be effective, it is equally true that the education of the citizenship in positive and practical understanding of the task must be planned on the same scale. Wherever people congregate, the story of defense must be presented."

In taking the position that by placing strong emphasis on the defense angle and the part that the exhibiting members as well as that which refrigeration as a whole is playing in protecting the public health it was concluded that the All-Industry show in January can perform an unusually timely service for refrigeration by dramatizing what it has been, now is doing and can do for the well being of the citizenry—the military personnel as well as the civilians.

PREPARE FOR THE FUTURE... OFFER REGULAR CHECK-UP SERVICE NOW!



MAYBE Confucius didn't say it, but *when stream freezes over is time to store ice for summer.* Likewise, now when people are conservation-minded, it is time to store up goodwill and future business by helping your customer make the best use of what he has.

You can be a big help to your customer and yourself... by offering a regular check-up service. You won't meet sales resistance. In fact, this service puts you in solid with the customer for the better days to come.

Let us help you . . .

A great conservation of "Freon-12" can

be made in the servicing of equipment and in handling. We recognize that there is no substitute for sound, practical experience... and that there already is literature available on the handling of refrigerants. But we have gathered together information on major causes of waste and loss into a convenient new booklet covering these points in detail.

This booklet is designed as a helpful guide to assist you in making the most of your new opportunity—a regular check-up service to reduce waste and losses. Send for it now!



TO THE FUTURE
TAKE A LOOK—
WRITE TODAY FOR
THIS FREE BOOK!



FREON

REG. U. S. PAT. OFF.

safe refrigerants

"Freon" is Kinetic's registered trade-mark for its fluorine refrigerants.

TAKE A TIP from the Chinese Doctor—who is paid to keep patients well. This service manual will help you keep your patients thinking along conservation lines.

KINETIC CHEMICALS, INC., TENTH & MARKETS STREETS, WILMINGTON, DELAWARE

SERVICE ENGINEER

53

November, 1941

ON TO CHICAGO

8th Convention

REFRIGERATION SERVICE

ENGINEERS SOCIETY

STEVENS
HOTEL

JANUARY 12-14

DEFENSE NEEDS

REFRIGERATION

NOW—of all times you should attend the **Annual R.S.E.S. Convention** CHICAGO—JAN. 12-14

It's a most important business investment to you—
Make it a date

ILLINOIS STATE ASSOCIATION FOURTH ANNUAL CONVENTION

FOR the fourth consecutive year since its organization, the Illinois State Association held its annual meeting, this time at the Leland Hotel in Aurora, Ill., on October 18 and 19.

Representatives from chapters from all parts of the state were present for the business and educational sessions. During the second day of the meeting, at the invitation of the Springfield Chapter, the meeting voted to hold its next year's convention in Springfield, Ill.

The meeting was called to order Saturday morning by C. L. Hartman, President of the State Association. The welcoming address was delivered by A. R. Carter, Mayor of the city of Aurora.

Saturday Afternoon

The first speaker of the afternoon session was R. B. Stevenson of the Davison Chemical Company on the subject of "Moisture Problems." Unfortunately Mr. Stevenson was unable to appear in person and delivery of his talk was made by long distance telephone and amplifier hookup with Mr. Stevenson's office in Baltimore. The telephone hookup was two-way, permitting questions to be relayed to Mr. Stevenson.

The report of the nominating committee was received next and the meeting unanimously agreed with the committee by making no further nominations and accepting their recommendations. Those elected were: *President*, James J. Kline; *First Vice-President*, B. V. Clark; *Second Vice-President*, E. Seaton; *Secretary*, Glen Dresback; *Treasurer*, A. D. McGill; *Sergeant-At-Arms*, R. M. Potter.

Continuing with the educational program J. S. Kimmel, Republic Electric Company, Davenport, Iowa, presented a talk on priorities, sketching in brief the material situation of today and outlining the importance of the work being done in securing petitions to congressmen bearing the signatures of all food purveyors.

The annual report of the retiring officers included a brief summary of the year's activities by the secretary and a satisfactory financial report by the treasurer. Following these reports the new officers took office.

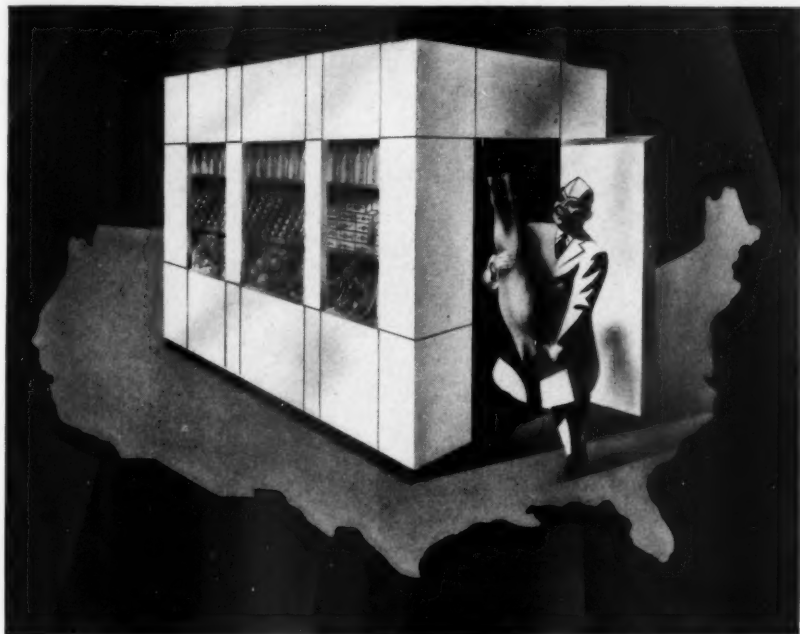
A playlet entitled "The Ideal Service Man" by the Tri-County players provided an instructive and amusing period of entertainment. It was well carried out, contrasting the extremes of the slipshod, unbusinesslike service man with the smart appearing, go-getting type.

The afternoon session was completed with the showing of two movies, the first taken by Herman Goldberg at various R.S.E.S. functions; the second, entitled "Look To Lockheed For Leadership." The latter movie traced the growth of Lockheed planes and showed the methods used today in the manufacture and assembly of planes.

During the earlier part of the afternoon the ladies were entertained at a bingo party. The banquet took place Saturday evening and dancing followed. Music and entertainment was provided during and after dinner.

Sunday, October 19

The meeting Sunday morning was called to order by the new President, James J. Kline, and the first speaker was Harold Anderson, President of the Tri-County Chapter, on "The Hermetic Compressor—Model 1912." His talk described the con-



is refrigeration essential?

If the health of the nation is important . . . if the prevention of food spoilage is a vital necessity . . . if waste is a direct blow at defense . . . then there can be no question but that refrigeration *is essential* . . . emphatically so! . . . Today, America literally lives out of a refrigerator. The uninterrupted flow of perishable foods from producer, through distributor, to consumer depends solely on the continuous functioning of refrigeration . . . mechanical refrigeration. And, there is no available substitute. . . . The unprecedented need for refrigeration by our armed forces was bound to cause a scarcity of parts and materials for civilian use . . . but, the maintenance of existing refrigeration equipment, at least, is a **MUST** . . . *Defense demands it!*



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PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION
AND AIR CONDITIONING • ALSO AMMONIA VALVES AND FORGED STEEL FITTINGS



Views at the Illinois State Association Annual Banquet taken by Irving Alter of the Harry Alter Co. The upper left picture shows the new officers of the association and the upper right picture shows one section of the group who saw the movies on the program.

struction and history of a hermetic compressor employing SO₂ built in 1912 which has been operating for about thirty years with comparatively little trouble.

The compressor was sold under the name of "Audifren." The idea was conceived by a French bellmaker who, it is reported, worked seven years to construct the first unit. The idea eventually was brought to this country where General Electric engineers set about building the same type of compressor in this country.

"Ultra Violet Ray In Refrigeration" was discussed by Fred Strombeck of the Spertl Electric Company. In addition Mr. Strombeck outlined many other industrial uses of the violet ray and conducted an interesting demonstration of black light.

J. B. Merkel of Ranco, Inc., discussed

"Practical Installations of Blower Coils Using Solenoid Valves and Two-Temperature Controls." To illustrate his talk Mr. Merkel used large schematic drawings of various installations and discussed at length difficulties encountered in these systems and how they might be remedied.

Resolutions

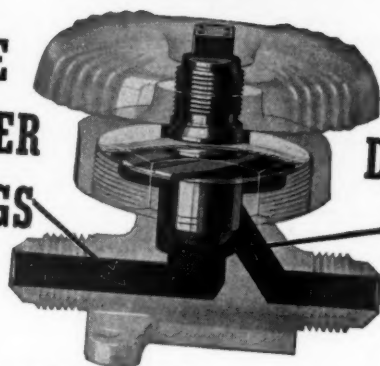
Among the resolutions presented before the meeting for adoption was one suggesting to the National Board of Directors that the R.S.E.S. foster a campaign through its organization to enlist the aid of all retailers of foods, such as, grocers, butchers, etc. These retailers should be asked to have their customers, namely, housewives and other purchasers of family foods, sign their names to petitions supplied by the R.S.E.S. pro-

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L. H. GILMER COMPANY
TACONY, PHILADELPHIA, PA.

testing against unnecessary food spoilage and subsequent physical ailment because of possible neglect of repairs to existing mechanical equipment.

It was recommended that non-member refrigeration service engineers be enlisted in this campaign.

NEW YORK STATE ASSOCIATION HOLDS SECOND ANNUAL MEETING

REPRESENTATIVES of chapters located in New York State and members from Massachusetts, Virginia, Connecticut, New Jersey and Pennsylvania, assembled in New York City at the Astor Hotel on October 23 and 24 to participate in the two-day educational conference.

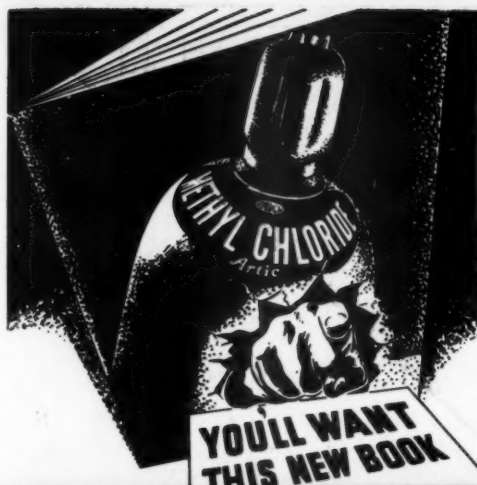
Among the plans discussed for future meetings was one designed to secure the cooperation of all the chapters in the Eastern States and to broaden the annual convention into a meeting of Eastern Seaboard Chapters. Through this plan it is hoped to increase attendance and eliminate duplication of convention activities. The newly elected officers and Board of Directors will consider this plan for the next annual meeting which will be held in Buffalo.

Thursday, October 23

The convention was called to order by Ernest E. Condon, Vice President of the New York Chapter, who introduced the state officers.

John K. Bush, President of the New York State Association, pointed out in his opening remarks how essential it was for an R.S.E.S. association in this present emergency. The importance of the Society has increased at this time because the opportunity provided to act cooperatively in our contacts with governmental agencies and to interchange ideas designed to assist every member in meeting the unprecedented conditions of today.

Secretary Condon and Treasurer Ralph D. Davis of Buffalo submitted their reports showing the progress the association had made during the year. The first educational paper on the subject of "Brazing in the Refrigeration Shop" was presented by R. N. Chapin, Air Reduction Sales Company, New York, which proved to be a most interesting and timely talk. Mr. Chapin pointed out that many more refrigeration



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shops will find it necessary in the future to use brazing equipment due to the shortage of materials which will force the repair of parts ordinarily replaced. His paper in full appears elsewhere in this issue.

J. H. Eldridge of the Virginia Smelting Company and T. V. Gardner of the High-side Chemical Company, presented next a technicolor movie of the manufacture of the Virginia Smelting Company refrigerants and laboratory tests showing the use of Thawzone.

The afternoon session received the report of the nominating committee and unanimously concurred in its recommendations, electing the following officers for the ensuing year: *President*, George Gardner, Schenectady; *First Vice-President*, Eugene Phillips, Rockaway Beach; *Second Vice-President*, Weldon Andrews, Syracuse; *Secretary*, Ernest E. Condon, Flushing; *Treasurer*, Ralph D. Davis, Buffalo; *Sergeant-At-Arms*, Ralph Feathers.

In the resolutions committee report given on Friday it was recommended that the President appoint Past President J. K. Bush as Chairman of the executive committee in appreciation of the services he performed on behalf of the State Association. It was felt that in his new appointment Mr.

Bush could actively continue in the program to further the value of the state organization.

The annual banquet was held on Thursday evening. The new state officers were presented at this time by Past President Bush. One of the entertaining features was an interesting movie and talk by officers of the U. S. Secret Service on "Know Your Money." This talk explained how the public could cooperate with federal agencies in stamping out counterfeiting.

Friday, October 24

The first speaker of the morning was H. T. McDermott, National Secretary of the Society. He related his experiences in his contacts with the Office of Production Management in Washington and outlined the provisions of recently enacted orders in respect to securing parts for maintenance and repair of equipment.

Following this discussion Edward Kellie, Vice President of the American Injector Company, Detroit, spoke on the subject of "Why Oil Separators?" In this paper Mr. Kellie outlined the effects of oil circulating in the refrigerating system and pointed out the benefits to be derived from the installa-

MARSH

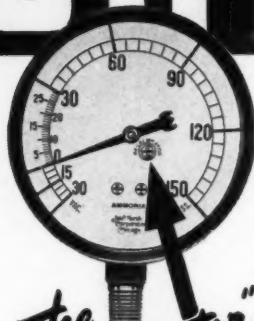
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tion of oil separators. He stated that now is the time to sell oil separators when it is imperative that old equipment be made to perform at its best.

K. E. Cash, Sales Promotion Manager of Penn Electric Switch Company, Goshen, Indiana, pointed out in his opening remarks the tremendous importance of refrigeration in the country's defense program. He went on further to explain the necessity of adequate control of food preservation. His talk was most interesting and instructive to the meeting.

"The Making and Preservation of Ice Cream" was the next subject of discussion by E. J. Newcomer, Mills Novelty Company. In this discussion Mr. Newcomer traced as far back as possible the history of ices and ice cream, and according to his findings, the history of cool drinks and frozen desserts dates back to the thirteenth century. He further outlined the growth of the industry to the present day, describing certain patents that led to its present success. A considerable portion of his paper was devoted to the methods of making ice cream and methods of calculating the loads en-

countered in the freezing and hardening of ice cream.

Friday Afternoon

D. A. Newton, Carrier Corporation, presented a movie on "Modern Air Conditioning of Today and Its Future." The movie provided an interesting and informative picture on the application of air conditioning equipment.

H. F. Bell of Servel, Inc., provided some very practical information on the timely subject of "Hermetic Commercial Compressors of the Future." In this discussion Mr. Bell described among other things, Servel's Supermetic compressor which was thoroughly described and illustrated on Page 19 of the March, 1941 issue of THE REFRIGERATION SERVICE ENGINEER.

The final educational talk of the meeting was provided by Edwin Kingsley, Zone Principle Mechanical Engineer of the Army Quartermaster Department. In this talk Mr. Kingsley pointed out that the most important item of the soldier's diet is fresh beef. He went on to describe the necessity of refrigeration at all times to keep the



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Army's food fresh. A rather complete description of the standard cold storage centers, together with the type of equipment installed in them and the manner in which they are installed, provided some interesting figures on this construction.

Refrigeration in the mess halls was also described and plans for standard refrigerated trucks to be used in field maneuvers gave an insight to future refrigeration requirements of the Army. Methods of servicing and maintaining the equipment revealed the training program being conducted by the Army.

In his final remarks Mr. Kingsley described how the huge task of building these Army camps has been split up over the nation and under whose authority it is being handled.

Resolutions

Among other things, the Resolutions Committee urged the R.S.E.S. to continue its cooperation with every other association and committee working in the interest of securing the necessary new equipment and supplies for the industry in the present emergency.

Mr. Ted Glou spoke on the recently formed Record Committee and outlined the work it is doing in securing signatures from the customers of each and every service company.

Ladies' Program

On Thursday the ladies were entertained during the afternoon with a trip to the Museum of the City of New York. In the evening, of course, they attended the banquet and were present for the movie and talk "Know Your Money."

On Friday, October 24, the ladies spent the afternoon in a subway ride to the Ferry where they took a Ferry ride to the Statue of Liberty and made a tour of the statue. The evening was occupied with a get-together-party which everyone attended.

ASSOCIATIONS PLAY PART IN DEFENSE

TRADE associations are playing an important part in defense preparations. The Department of Commerce finds that more than 500 have been contacted by OPM and other defense agencies. The increasing number of priority requests—as many as 5,000 in

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a single week—has emphasized the need of reliable statistical information of the type gathered by many trade associations, of which there are approximately 8,000 in the country.
—United States Chamber of Commerce.

The Refrigeration Service Engineers Society is doing its part in cooperating with government agencies and representing the interests of the men engaged in servicing and maintaining refrigeration equipment.

HERMAN GOLDBERG'S ANNUAL PARTY

HERMAN GOLDBERG announces his fifth annual party to be held as usual in the North Ballroom of the Stevens Hotel, Thursday evening, December 11, 1941.

In the past these parties have drawn an increasingly large crowd. They have become so popular that the industry expects and looks forward to them each year. Herman is making arrangements to accommodate 800 people this year.

A well known orchestra will provide the music interspersed with a floor show of several acts. Arrangements for this entertainment are being made now. Door and dance contest prizes have been a feature of past parties and this year Herman promises more of these prizes.

The refrigeration industry is invited to attend.

Twin Cities Take Action—Aids Field

SETTING an example of what can be done by the various R.S.E.S. chapters, the aggressive action taken by the Twin Cities Chapter in recent months has gained the attention and gratitude of every refrigeration man in the area. Not only have their efforts aided the refrigeration men but other industries such as air conditioning contractors, electricians, heating and ventilating men, oil, gas and stoker service men, dry cleaners and other groups are benefited.

Indicative of the recognition the chapter is receiving through its good work is the increase in its membership. Within the last few months their membership has more than doubled making the chapter one of the two largest in the country.

Its efforts were directed along two lines. The first was to encourage men of the in-

dustry to write their congressmen, impressing on them the importance of refrigeration in our defense effort. As a part of this campaign the following letter was sent to all men of the industry in the area:

September 8, 1941

MEN IN THE REFRIGERATION INDUSTRY

The Twin Cities Chapter of the Refrigeration Service Engineer's Society voted at their last meeting to ask the help of all Northwest refrigeration men in their efforts to acquaint the Office of Production Management with the problems confronting this industry.

We all want to do our part in this National emergency and we know that some sacrifices are necessary but our industry has been harder hit than most and we feel that some of our troubles could be remedied if the authorities were better acquainted with our needs.

Will you write the Office of Production Management, Washington, D. C., and your Congressman, in your own words, asking that something be done to insure our getting a reasonable amount of tube and fittings of copper; valves, fittings, controls, dehydrators and strainers of brass; and chlorinated refrigerants. Mention, of course, in your letter, the importance of refrigeration in maintaining public health and well-being.

We could, of course, have a card printed for you to sign and mail, or we could have a petition made up, but in these days with everyone trying to get the ear of the "powers that be" this "smacks" too much of professional lobbying. We know that a card or a letter typed or written by you on your own stationery would carry a lot more weight.

It would also help a great deal if your customers—the butchers, ice cream manufacturers, locker plant operators, and other businessmen interested in this problem wrote these same authorities.

We are confident that if you will cooperate with us and mail these letters today, that some action will be taken to protect our industry.

Very truly yours,
Twin Cities Chapter,
Committee on Legislation.

The second line of effort was directed toward obtaining some modification of the city ordinance governing refrigeration installation and maintenance which would permit necessary changes due to shortages of certain materials. Their efforts resulted in the following ordinance being passed September 12, 1941:

Minneapolis Ordinance Modified During Emergency

Authorizing certain deviations from the requirements of the ordinances of the City of Minneapolis regulating the installation, alteration and repair of refrigeration, electrical wiring, air conditioning, heating and ventilating, oil and gas burner installations, stokers, flammable liquid installations, and dry cleaning deemed appropriate and made necessary by the present national emergency, and prescribing the procedure relative thereto.

Whereas during the present national emergency it has become impossible to secure some materials to strictly comply with present ordinances of the City of Minneapolis, with respect to certain construction, installations, alterations and repairs.

Now, therefore, the City Council of the City of Minneapolis to ordain as follows:

Section 1. The Inspector of Buildings and the Chief of the Fire Prevention Bureau of the City of Minneapolis be and they are hereby authorized



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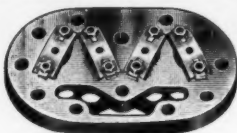
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to jointly recommend in writing deviations from the present ordinances of the City of Minneapolis relating to and regulating the construction, installation, alteration and repair of refrigeration, electrical wiring, air conditioning, heating and ventilating, oil and gas burner installations, stokers, flammable liquid installations, and dry cleaning, which they find are necessary because of the lack of materials, due to the national emergency, and which deviations they deem appropriate and necessary and which in their judgment will not materially affect the public health, safety and welfare, or the health, safety and welfare of occupants of premises upon which such deviations are permitted. Such recommendations of such officers may be general or special, and shall set forth in detail the deviations approved and recommended by them, and the reasons therefor. Such recommendations shall be filed with the City Clerk and presented to the City Council, which may either approve or disapprove the same. Any deviation from the ordinances of the City shall be unlawful unless and until the City Council shall in regular or special meeting approve the same.

Section 2. Any person who shall violate any of the provisions of this ordinance shall, upon conviction thereof before the Municipal Court of the City of Minneapolis, be punished by a fine of not exceeding One Hundred Dollars (\$100.00), or by imprisonment until such fine is paid for not exceeding ninety (90) days.

Section 3. This ordinance shall take effect and be in force from and after its publication, and the authority hereby granted shall cease at the conclusion of the national emergency, or sooner if the necessity therefor no longer exists.

A few days after this ordinance had become public, further regulations applying to refrigeration in particular and tending to clarify the ordinance was issued by the Minneapolis Fire Prevention Bureau. This regulation follows:

Fire Prevention Bureau Clarification

Regulations to be followed where it is desired to change present installations of refrigerating systems using Freon as a refrigerant to systems using other refrigerants which are regulated by the present ordinance governing such installations.

The present ordinance to regulate the use of flammable and dangerous liquids as a refrigerant shall be complied with in every way possible during the present emergency. Where it is necessary due to the inability to obtain Freon to change the present Freon installations to systems using other refrigerants, the following regulations shall be complied with: All refrigerant piping, tubing and fittings shall be of a material suitable for the refrigerant employed. Shut-off valves shall be installed on liquid and suction lines at the generator. If pipe lines exceed 50 feet in length additional shut-off valves shall be installed at evaporators. All valves and piping shall be adequately protected against mechanical injury and shall be rigidly secured in place. The present location of the generator need not be changed if it is found impossible to comply with the requirements of the present ordinance as to location of generator.

It shall be necessary to secure a permit from the Fire Prevention Bureau before any system containing Freon can be changed over to a system using any other refrigerant. In all present Freon systems where a changeover is made to use any other refrigerant a card shall be posted at the generator setting forth the date changeover was made, the type of refrigerant used and the amount of refrigerant; the number of the permit allowing changeover shall also be on the card.

All systems now using Freon as a refrigerant which are changed over to use another refrigerant governed by the present ordinance shall be changed back to Freon systems or shall be made to comply with the present ordinance regulating the use of flammable and dangerous liquids as a refrigerant at the conclusion of the present national emergency or sooner if the necessity therefor no longer exists.



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Safety ball seats shut off liquid in case of glass breakage.

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**MASSACHUSETTS STATE
ASSOCIATION TO HOLD FIRST
ANNUAL MEETING**

THE first annual convention of the Massachusetts State Association will be held Sunday, November 16, at the Kenmore Hotel, Boston, Massachusetts.

Plans are being rapidly completed for an interesting educational program combined with business discussions and entertainment features for both the ladies and men.

According to the committees working on these plans, every feature will be interesting and instructive. The information will lean largely toward the material situation of the day and activities of your Society and various other groups who are working for the industry at large in Washington.

While the meeting is for one day only, arrangements are being made so that distant members may register on Saturday afternoon.

Adequate entertainment for the ladies during the meeting hours will be provided by a Ladies' Committee.

R. S. E. S. Chapter Notes

MISSISSIPPI VALLEY CHAPTER

September 30—The meeting was called to order by President E. J. Soens, the roll call of officers was taken and the minutes of the previous meeting read. C. L. Hartman, Past President of the Illinois State Association, gave a brief talk on the convention held at Aurora at the Leland Hotel. A letter from the Highside Chemical Company, informing the chapter that a movie on Thawzone is now available, was read. After some discussion the secretary was asked to write Highside Chemical Company for a reservation for the film.

MILE HIGH CHAPTER

October 20—During the business session of the evening, committees as follows were appointed by the president: *Membership Committee*, J. R. Hooke, T. C. Alexander, P. F. Redlingshafer; *Educational Committee*, H. R. McCombs, E. L. Martin, W. F. Hemphill; *Finance Committee*, L. M. Martin, J. L. Taylor, C. E. Koogle; *Entertainment Committee*, P. Bowman, A. C. Darby, W. V. Mitchell.

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**CHRISTMAS
SEALS**

A report was received from the committee which had been appointed for the purpose of determining the best suited night for future meetings. After some discussion the second Monday of each month was decided upon. H. R. McCombs gave his views on the new amendment to order P-22. He also outlined a plan, in which every service man was asked to cooperate, to obtain signatures of all commercial and domestic customers on a petition intended to be sent to the congressmen of each district. It is hoped that through these petitions an A-3 rating for refrigeration may be secured. A supply of the petitions, it was announced, would be available soon. The meeting accepted the idea whole-heartedly and went on record as offering its full cooperation to the plan. Refreshments were served following the meeting.

VIRGINIA CHAPTER

October 3—After the meeting had been called to order and the minutes of the previous meeting read, an announcement was made that the Ladies Auxiliary is now in its stage of formation. Some discussion was held on the future method of paying dues and the chapter voted in favor of purchasing a book of Roberts Rules.

October 17—The meeting was held at Columbus Hall and was called to order by President R. W. Lampie. In a discussion on future educational programs the committee was asked to appoint some qualified person within the membership to talk on a specified subject each month. In trying to determine which would be the most suitable nights for meetings, it was decided that the first and third Fridays of each month would be the future meeting dates.

ROCKFORD CHAPTER

October 6—During the business session of the evening several committee reports were received and the president appointed O. H. LaBudde as Educational Chairman for the next meeting. A letter from Highside Chemical Company, offering the use of their film on Thawzone was turned over to the Educational Chairman. Mr. LaBudde was asked to write the company, making reservations for the picture. The attendance prize was drawn by the Sergeant-at-Arms and the name drawn was Henry Genin.

October 20—The business session of the evening was conducted by President E. J. Seaton and the annual reports of the secretary and treasurer were presented. Following this business session the annual election of officers took place with the following results: *President*, Chas. G. Henley; *First Vice-president*, Harry Lindquist; *Second Vice-president*, LaVerne Johnson; *Secretary*, Donald R. Starin; *Treasurer*, O. H. LaBudde; *Sergeant-at-Arms*, Edwin Wendt;

Educational Chairman, E. J. Seaton; Board of Directors, A. W. Overman, V. R. Kruse, Henry Genin.

WORCESTER CHAPTER

The main feature of the last meeting of the chapter was the annual election of officers and after following the usual procedure of such elections, the outcome was as follows: *President, H. Pierce Goodney; First Vice-president, Chas. J. Delnolino; Second Vice-president, M. F. Colbert; Secretary-Treasurer, T. H. Cronk; Sergeant-at-Arms, J. A. Osper; Chairman Educational Committee, W. E. Tierney; Board of Directors, H. E. Manchester, E. P. Holter, C. S. Van Werth; Publicity Chairman, Emerson Holter, Examining Board Chairman, James Hammill.*

CENTRAL INDIANA CHAPTER

October 7—The meeting was called to order by Vice-president Hale in the absence of the president. Two members were taken into the chapter and Charles Penrod of Bluffton was appointed Chairman of the Nominating Committee, with Francis Holloway, of Marion, and Denny Miller, of Kokomo, as members of the committee. The secretary was instructed to purchase Christmas cards for the chapter and arrange an educational program for the winter season. Announcement was made of another party being planned for some time in November. Definite announcements to be made later.

ST. LOUIS CHAPTER

July 24—A tour of inspection was enjoyed by the chapter on this date. A very enjoyable dinner at the Hotel Chase preceded the inspection, after which the group made a tour of the air conditioning system in the hotel's zodiac bar and cocktail lounge. The next stop was the largest technical library in the United States, that of Messrs. Eilers and Schaumberg, patent attorneys. The air conditioning system in this library was thoroughly inspected and Mr. Eilers, proving himself a most congenial host, insisted on serving the members refreshments.



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This tour proved so enjoyable to the membership that plans for other such tours are being made and the entire membership is looking forward to it with considerable anticipation.

NIAGARA FRONTIER CHAPTER

The chapter held its first meeting of the Fall season in the Como Restaurant in Buffalo. John K. Bush, president, presided. Several ladies' nights in coming months will be held. Educational programs also will be conducted although Mr. Bush pointed out it is becoming increasingly difficult to secure speakers from the trade. He appointed two committee chairmen for the coming year: A. H. Keirn, Educational, and Leon McCormick, Entertainment.

Ladies Auxiliary

ROCKFORD AUXILIARY

September 15—The meeting was called to order by the president of the auxiliary who immediately called for a report on the quilt raffle which showed a very satisfactory profit. A letter of thanks from the men's chapter, expressing their appreciation of the help given by the ladies at the picnic, was read. One of the members, Mrs. Henley, was reported as having had an accident and the secretary was instructed to send her a card of condolence. A request was received from the men's chapter in which they asked the ladies to take charge of the refreshments at the forthcoming Halloween party. The balance of the evening was spent in playing airplane bunco with Mesdames Overman, Kruse and McCarthy proving the winners.

October 6—The minutes of the previous meeting were read, the treasurer gave a report of the bank balance and the secretary handed in current expense bills. The balance of the evening was spent in playing Hearts, with Mesdames Overman, Larson and LaBudde, winning the prizes. An invitation from the men's chapter resulted in the ladies participating in refreshments, which was greatly appreciated.

October 20—Arrangements for supplying refreshments at the forthcoming dance was the first order of business. Mesdames McCarthy and Larson were appointed a committee of two to do the purchasing. Mrs. Shipman was welcomed as a new member to the auxiliary. Following adjournment of the business meeting the evening was spent in playing British Rummy, with Mesdames McCarthy, Shipman and Overman taking the prizes.

ILLINOIS VALLEY AUXILIARY

August 1—Considerable time was spent in conducting business matters of the auxil-

iary after which the meeting was adjourned and the balance of the evening spent in playing Pinochle. Mesdames Sackey, Harris and Dresback won the prizes. Refreshments were enjoyed in the Coffee Shop of the Jefferson Hotel.

August 15—In a report received from the treasurer, it was revealed that the ladies had made the sum of \$7.35 at the state picnic from the bingo games. This amount was turned in to the auxiliary treasury for future entertainment of the auxiliary. Pinochle occupied the balance of the evening with Mesdames Fait, Prince and Harris winning the prizes.

TRI-STATE AUXILIARY

October 14—The meeting was held in the home of Mrs. Forrest Poole. After a short business session, Chinese Checkers were played and light refreshments were served at the close of the entertainment.

ROTARY SEAL GOLF TOURNAMENT

The Rotary Seal Company employees again tried their golfing ability at the Cary Country Club in the company's second annual tournament held September 20. Defending champion, Stan Smiley, had considerable trouble controlling his left hand clubs and he was dethroned.



Rotary Seal Company Golfers during a recent tournament

After 27 holes over the long and very hilly course, Bill Jakubec posted a low gross of 94 which was the best employee's score of the day. The club champion is decided on a handicap basis and Chuck Jusewich

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was elevated into the championship by an 84 stroke handicap which gave him a low net of 61 after he shot 145 on the final 18 holes. Both lads work in the Finishing and Assembling Department on Rotary Seal replacement units.

Prizes for other accomplishments performed on the golf course, other than that of accumulating blisters, were also awarded.

§ § §

PENN PERSONNEL CHANGES

R. H. Luscombe, Sales Manager of Penn Electric Switch Co., Goshen, Indiana, has recently announced the following personnel changes: K. W. Cash has been made Sales Promotion Manager; J. R. Netedu, formerly Assistant Advertising Manager of Fairbanks, Morse & Co., Chicago, is appointed Advertising Manager; and E. M. Ford, for the past few years in the Advertising Department, has been promoted to Assistant Advertising Manager.

§ § §

ISRAEL TO HEAD AD CLUB

ROLLIN H. ISRAEL, advertising and sales promotion director of the Virginia Smelting Company, has been elected president of the Norfolk (Va.) Ad Club, one of Norfolk's most active civic organizations. He will succeed John W. New, retiring president, on October 18th.



ROLLIN H. ISRAEL

Mr. Israel is well known to the industry through his activities as field representative for "Virginia" from 1930 to 1938; his work during the past three years as head of the advertising department has attracted much favorable attention.

MIDWEST JOBBERS MEET

The meeting was held at the Hotel Ft. Des Moines, October 12, and refrigeration supply jobbers from Kansas City; Lincoln, Nebraska; Omaha, Nebraska; Sioux City; Waterloo; Davenport; and Des Moines; and also Minneapolis attended. Many subjects were discussed. The next meeting is to be held on December 8 as a dinner meeting. Manufacturers are invited to be present.

ALTER'S NEW CATALOG

The Harry Alter Company's new Fall and Winter Catalog No. 186 has just been published and is available upon request.

In an effort to clarify the priority problem for their customers, the company has inserted two pages of explanation together with gummed labels to be attached to A-10 orders. This is intended to facilitate the proper method of making out such orders, thus aiding in the prompt shipment of materials.

THE REFRIGERATION SERVICE ENGINEER November, 1941

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, and March 3, 1935, of THE REFRIGERATION SERVICE ENGINEER, published monthly at 435 North Wacker Ave., Chicago, Ill., for October, 1941.

State of Illinois, Cook County, ss:—Before me a Notary Public in and for the State and county aforesaid, personally appeared J. F. Nickerson, who, having been duly sworn according to law, deposes and says that he is the editor of THE REFRIGERATION SERVICE ENGINEER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, and March 3, 1935, embodied in section 435, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Nickerson & Collins Company, Chicago, Ill.; Editor, J. F. Nickerson, Chicago, Ill.; Managing Editor, H. T. McDermott, Oak Park, Ill.; Business Manager, L. H. Townsley, Chicago, Ill.

2. That the owners are: Nickerson & Collins Co., Chicago, Ill.; J. F. Nickerson, Chicago, Ill.; Estate of S. P. Stevenson, Chester, Pa.; M. B. Livezey, Philadelphia, Pa.; L. R. Townsley, Chicago, Ill.; Estate of Oscar Stevenson, Chester, Pa.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: There are no bondholders, mortgages, or other security holders.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, as they appear upon the books of the company but also in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Signed) J. F. NICKERSON, Editor.

Sworn to and subscribed before me this 29th day of September, 1941. L. R. Townsley, notary public. (Seal.) (My commission expires July 8, 1944.)

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